

# User Manual For SL Series

**Smart & Accurate**



# Preface


This manual is a user guide that provides the information on how to install, operate and maintain SA series AC servo drive. The contents of this manual include the following topics:

- Installation of AC servo drives and motors
- Configuration and wiring
- Trial run steps
- Control functions and adjusting methods of AC servo drives
- Parameter settings
- Inspection and maintenance
- Troubleshooting
- Application examples


Before using the product, please read this manual to ensure correct use. Users should thoroughly understand all safety precautions (DANGERS and WARNINGS) before proceeding with the installation, wiring and operation. If you still have any problem, please contact with the local Bonmet sales representative. Place this user manual in a safe location for future reference.

# Safety Precautions


## ● To prevent electric shock, note the following:

 <b>DANGEROUS</b>
<ul style="list-style-type: none"><li>• Before wiring or inspection, switch power off and wait for more than 10 minutes. Then, confirm the voltage is safe with voltage tester. Otherwise, you may get an electric shock.</li><li>• Wiring must be carried by electrical engineer.</li><li>• Connect the servo drive and servo motor to ground.</li><li>• Operate the switches with dry hand to prevent an electric shock.</li><li>• The cables should not be damaged, stressed, loaded, or pinched. Otherwise, you may get an electric shock.</li></ul>


## ● To prevent fire, note the following:

 <b>CAUTION</b>
<ul style="list-style-type: none"><li>• Do not install the servo drive, servo motor and regenerative brake resistor on or near combustibles. Otherwise a fire may cause.</li><li>• When the servo drive has become faulty, switch off the main power. Continuous flow of a large current may cause a fire.</li><li>• When there is a signal faulty as a regenerative brake resistor is used, please switch the main power off. Otherwise, a regenerative brake transistor fault may overheat the regenerative brake resistor and cause a fire.</li></ul>

## ● Wiring Precautions

 <b>CAUTION</b>
<ul style="list-style-type: none"><li>• Wire the equipment correctly and securely.</li><li>• Connect the output terminals (U, V, W) correctly.</li><li>• Do not connect AC power directly to the servo motor.</li></ul>

## ● Operation and Adjustment Precautions

 <b>CAUTION</b>
<ul style="list-style-type: none"><li>• Do not touch the radiator and the regenerative brake resistor as they are overheated.</li><li>• Do not set parameter value unduly. If so, system would be instable.</li><li>• Do not touch the rotating parts of the servo motor in operation. Doing so may cause injury.</li></ul>

## ● Others

 <b>CAUTION</b>
<ul style="list-style-type: none"><li>• Do not attempt to remold the servo drive.</li></ul>

# CONTENTS

<b>CHAPTER 1</b>	<b>MODEL AND SPECIFICATIONS</b>	<b>5</b>
1.1	NAMEPLATE	5
1.2	MODEL DESIGNATION	5
1.3	OUTLINE DIMENSION DRAWINGS (UNIT: MM)	5
1.4	TECHNICAL SPECIFICATIONS	6
1.4.1	<i>General Specifications</i>	6
<b>CHAPTER 2</b>	<b>WIRING AND OPERATION</b>	<b>7</b>
2.1	INSTALLATION SITES	7
2.2	INSTALLATION DIRECTION AND SPACE	7
2.3	CONNECTION	7
2.4	SCHEMATIC DIAGRAM OF POSITION CONTROL MODE	8
<b>CHAPTER 3</b>	<b>INTERFACE</b>	<b>9</b>
3.1	TERMINALS	10
3.2	POWER TERMINAL	10
3.3	ENCODER CONNECTOR CN1	10
3.3	I/O CONNECTOR CN2	10
3.4	LINE-LINE SERIAL TERMINAL COM/CN3	12
3.5	I/O INTERFACE TYPE	12
3.5.1	<i>Switching Input Interface</i>	12
3.5.2	<i>Switching Output Interface</i>	12
3.5.3	<i>Pulse Input Interface</i>	13
3.5.4	<i>Analog Input Interface</i>	15
3.5.5	<i>Encoder Signal Output Interface</i>	16
3.5.6	<i>Open Collector Output Interface for Encoder Phase-Z Signal</i>	17
3.5.7	<i>Optical Encoder Input Interface for Servo Motor</i>	18
<b>CHAPTER 4</b>	<b>OPERATION</b>	<b>18</b>
4.1	OPERATION PROCEDURE	18
4.2	PREPARING FOR OPERATION	19
4.2.1	<i>Turning Power ON and Checking Indicators</i>	19
4.3	POSITION CONTROL MODE	19
4.3.1	<i>Parameters In Position Control Mode</i>	20
4.3.2	<i>Operation</i>	20
4.4	SPEED MODE	20
4.4.1	<i>Parameters In Speed Control Mode</i>	21
4.4.2	<i>Operation</i>	21
4.5	TORQUE CONTROL MODE	22
4.5.1	<i>Parameters In Torque Control Mode</i>	22
4.5.2	<i>Operation</i>	22
4.6	GAIN ADJUSTMENT	22
4.6.1	<i>Speed Loop</i>	23
4.6.2	<i>Position Loop</i>	23
4.6.3	<i>Parameters Settings</i>	23

**CHAPTER 5    PARAMETERS .....24**

**5.1      PARAMETER LIST .....24**

**5.2      PARAMETER CONTENTS .....30**

**CHAPTER 6    PROTECTIVE FUNCTIONS .....43**

**6.1      WARNING LIST .....43**

**6.2      REMEDIES FOR ALARMS.....43**

# Chapter 1 Model and Specifications

## 1.1 Nameplate

<b>CAUTION</b> Do not inspect components unless the lamp is off. See manual for proper installation and operation.		
Model	SL10A	Model
INPUT	DC Power	Input Power
VOLTAGE	48~80V	
OUTPUT	3 phases	Nominal Output
VOLTAGE	0~80V	
Amps	10A	
S/N	0510 0001	Serial Number
BONMET MOTION GmbH		

Figure 1-1 Nameplate

## 1.2 Model Designation

S	L	10	A	XX
1	2	3	4	5

1. Product type: S- Series DC servo drive;
2. Power supply: 48~80VDC
3. Nominal current: 10A
4. Type code;
5. Software customized logo.

## 1.3 Outline Dimension Drawings (Unit: mm)

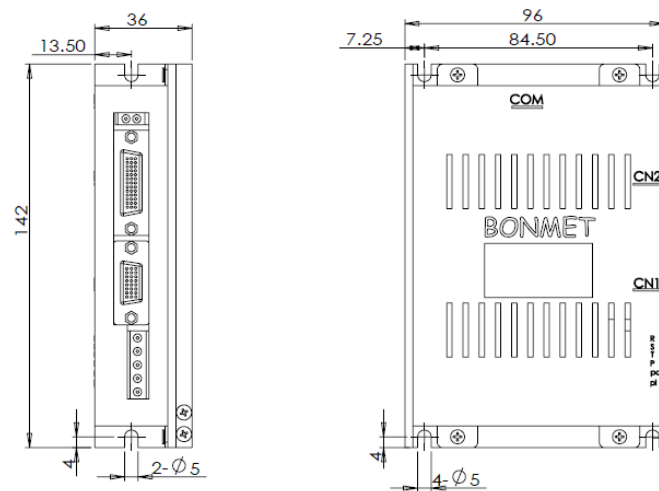


Figure 1-1 Dimension drawings

## 1.4 Technical Specifications

### 1.4.1 General Specifications

Input power supply		48~80VDC
Operation environment	Ambient temperature	Operation: 0~40℃ Storage: -40℃~50℃
	Ambient humidity	40%~80%( non-condensing)
	Atmospheric pressure	86~106kPa
Control mode		①Position ②Speed ③Torque
Features	Speed frequency response	≥300Hz
	Speed fluctuation ratio	<±0.03(Load 0~100%); <±0.02(Power Supply -15~+10%) (Value corresponds to the nominal speed)
	Speed ratio	1:5000
	Pulse frequency	≤500kHz
Input signals		①Servo enable ②Alarm clear
Output signals		①Alarm output②Positioning completed / speed reached
Position control mode		Pulse type ①Pulse + Direction ②CCW pulse / CW pulse ③A phase and B phase
		Electronic gear 1~32767/1~32767
		Feedback pulse 2500 C/T
Speed control mode		Four kinds of internal speed
Acceleration and deceleration function		Parameter setting :1~10000ms or 1~1000r/min
Monitoring function		Speed, current position, accumulation of command pulse, position deviation, motor torque, motor current, linear speed, rotor absolute position, command pulse frequency, operation state, I/O terminal signals, etc.
Protective functions		Overspeed, overvoltage, undervoltage, over current, Motor overheated , overload, Brake error, encoder error, control power error, location tolerance, etc.
Applicable load inertia		Less than five times of motor inertia

# Chapter 2 Wiring and Operation

## 2.1 Installation Sites

- Please install the servo system in the place without oil mist, dust or electrical control cabinet (ensure the temperature below 50°C, relative humidity below 80%. The long-term safety temperature below 40°C).
- Please install the servo system in the place without radioactive matters and combustibles.
- Take an anti-vibration measure to guarantee that the servo drive is free from vibration impact, ensuring the vibration under 0.5G (4.9m/s<sup>2</sup>).
- Please install the servo system in the place without direct sunlight.
- Interferential equipment nearby would take great effects to the power wire and control wire which will cause misoperation. For normal operation, a noise filter or any other anti-jamming measures is necessary to be carried out. Leakage current would increase after installing a noise filter, therefore an isolation transformer can be used to avoid this problem. Possessing a reasonable alignment and inhibit measures is very important because the control signal wire is easy to be interfered.

## 2.2 Installation Direction and Space

- The equipment must be installed in the specified direction. Otherwise, a fault may occur.
- Leave specified clearances between the servo drive and control box inside walls or other equipment.
- Leave a large clearance between the top of the servo drive and the internal surface of the control box, and install a fan to prevent the internal temperature of the control box from exceeding the environmental conditions.
- When using heat generating equipment such as the regenerative brake option, install them with full consideration of heat generation so that the servo drive is not affected. Install the servo drive on a perpendicular wall in the correct vertical direction.

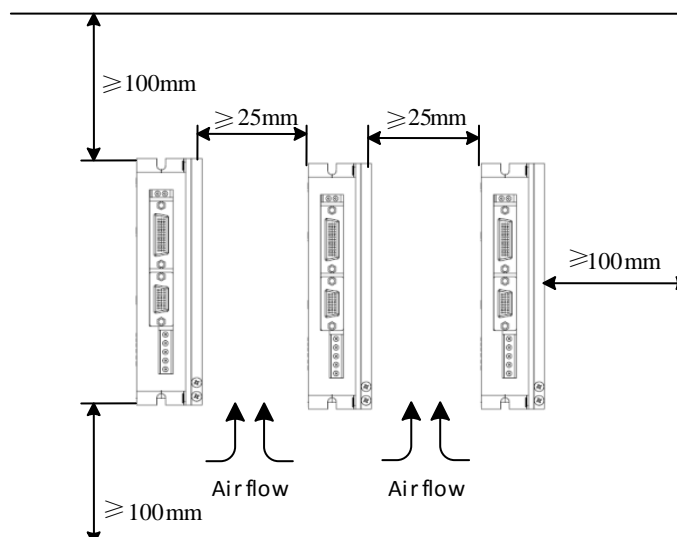


Figure 2-1 installation schematic diagram for drives

## 2.3 Connection



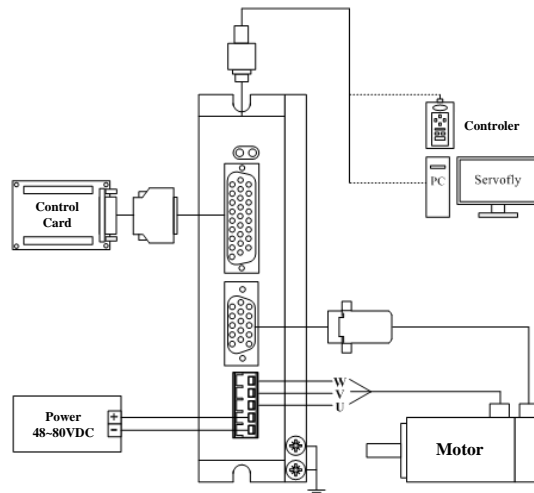


Figure 2-2 Connection graph

## 2.4 Schematic Diagram Of Position Control Mode

### ● Position mode

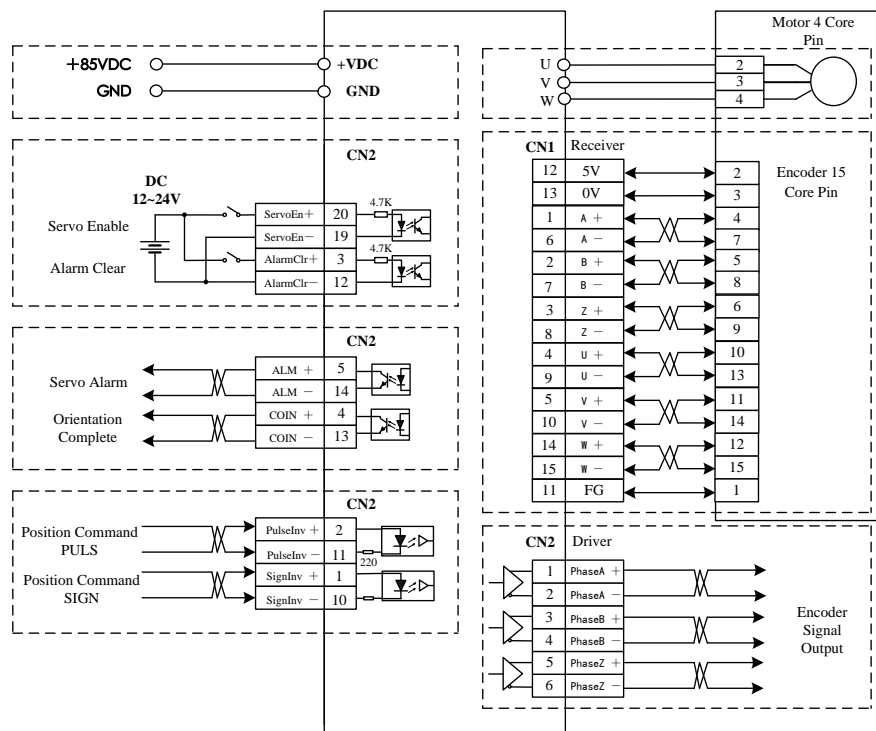


Figure 2-3 Position mode

### ● Speed mode

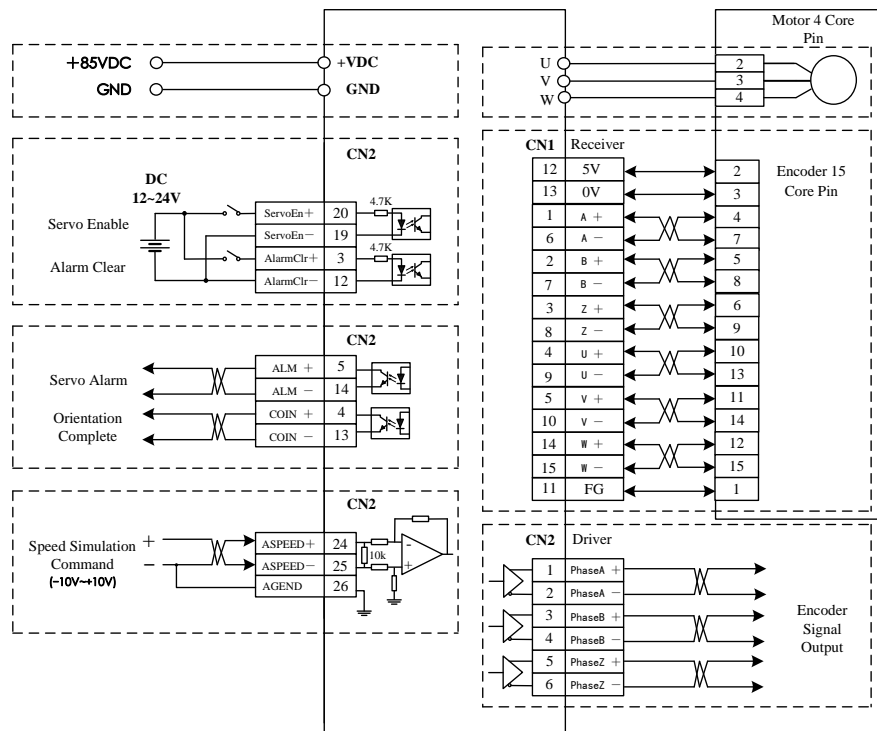


Figure 2-4 Speed mode

## ● Torque mode

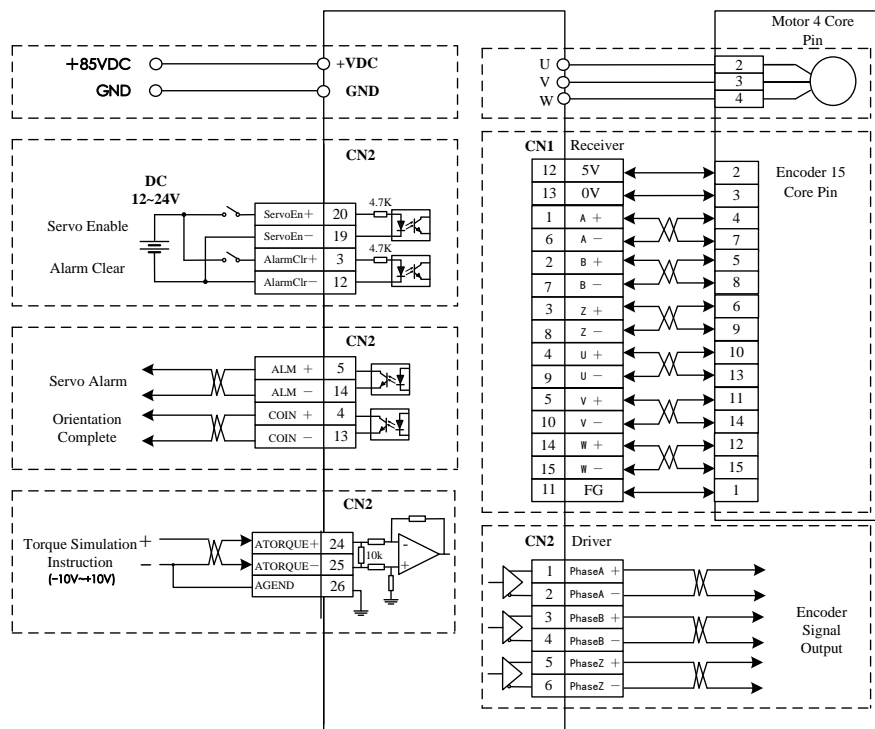


Figure 2-4 Torque mode

## Chapter 3 Interface

### 3.1 Terminals

Terminal	Name	Function
+VDC、GND	Drive power terminal	Connect with 48~80VDC
U、V、W	Motor terminal	Connect with motor
CN1	Encoder Connector	Connect with encoder
CN2	I/O Connector	I/O port
COM	Communication Connector	Connect with PC or controller

### 3.2 Power Terminal

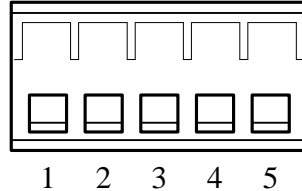


Figure 3-1 Power terminal

端子号	名称	端子记号	说明
1	Ground	GND	Connect with 0V
2	Power	+VDC	Connect with 48~80V
3	Motor U、V、W terminal	U	Connect with motor power terminal
4		V	
5		W	

### 3.3 Encoder Connector CN1

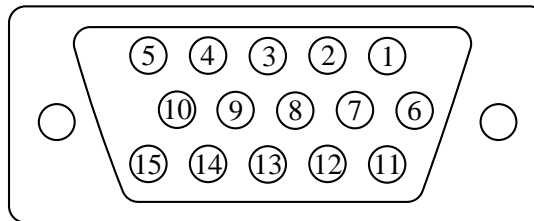


Figure 3-2 Encoder Connector (face to plug-welding)

Terminal number	Name	Function		
		Symbol	I/O	Description
12	Power supply (5V)	+5V		The power supply and public ground of encoder. It is necessary to use a parallel multi-cored wire to reduce the pressure drop of wires.
13	Public ground	0V		
1	Encoder A+ input	A +	Type7	Connect with the electro-optic encoder A+.
6	Encoder A- input	A -		Connect with the electro-optic encoder A-.
2	Encoder B+ input	B +	Type7	Connect with the electro-optic encoder B+.
7	Encoder B- input	B -		Connect with the electro-optic encoder B-.
3	Encoder Z+ input	Z +	Type7	Connect with the electro-optic encoder Z+.
8	Encoder Z- input	Z -		Connect with the electro-optic encoder Z-.
4	Encoder U+ input	U +	Type7	Connect with the electro-optic encoder U+.
9	Encoder U- input	U -		Connect with the electro-optic encoder U-.
5	Encoder V+ input	V +	Type7	Connect with the electro-optic encoder V+.
10	Encoder V- input	V -		Connect with the electro-optic encoder V-.
14	Encoder W+ input	W +	Type7	Connect with the electro-optic encoder W+.
15	Encoder W- input	W -		Connect with the electro-optic encoder W-.
11	Inhibit ground	FG		Terminal of Inhibit ground

### 3.3 I/O Connector CN2

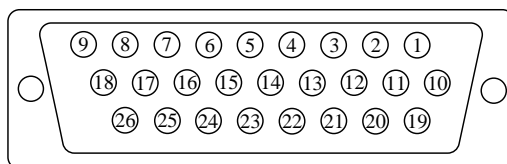


Figure 3-2 Plug-welding of plug CN2 (encoder FEEDBACK) (face to plug-welding)

Control mode: P stands for position control mode; S stands for speed control mode;

T stands for torque control mode.

Terminal number	Name	Terminal symbol			Function	
		Symbol	I/O	mode		
20	Servo enable	ServoEn +	Type1		Servo enable input terminal. ServoEn ON: Operation enabled; ServoEn OFF: Operation disabled. [Note 1]: Make sure the servo motor is quiescent before “ServoEn OFF” turns to “ServoEn ON” [Note 2]: Please wait for 50 ms before inputting any command in the State of “ServoEn ON”.	
19		ServoEn —				
3	Alarm clear	AlarmClr +	Type1		Alarm clear input terminal. AlarmClr ON: Clear the system alarm; AlarmClr OFF: Maintain the system alarm. [Note]: As the alarm code is less than 12, please cut off the power supply and repair the drive.	
12		AlarmClr —				
4	Positioning completed output (position control); speed reached output (speed control)	COIN +	Type1	P	Positioning completed output terminal: COIN ON:Positioning completed terminal outputs ON as the value of position offset counter is in the setting range, otherwise outputs OFF; Speed reached output terminal: COIN ON:Speed reached terminal outputs ON as the speed is equal to or over the selected speed, otherwise outputs OFF;	
				S		
13		COIN —		P		
				S		
5	Servo alarm output	Alarm +	Type2		Output terminal of servo alarm. ALM ON: Servo alarm output ON as there is no alarm; ALM OFF: Servo alarm output OFF as there is any alarm.	
14		Alarm —				
2	Command pulse PLUS input	PulseInv +	Type3	P	External command pulse input terminal. Note: pulse type is selected by parameter PN52. ①PN52=0, command pulse+ signal mode(default state); ②PN52=1, CCW/CW command pulse mode; ③PN52=2, 2-phase command pulse mode.	
11		PulseInv —				
1	Command pulse SIGN input	SignInv +	Type3	P		
10		SignInv —				
24	Analog command input	ASPEED + / ATORQUE +	Type4	S、T	Command input terminal for external analog torque/speed (difference mode), the impedance is 10kΩ, the voltage is -10V~+10V.	
25		ASPEED — / ATORQUE —				
26	Analog ground	AGND			The grounding line of analog input.	
7	Encoder Phase-A signal	PhaseA +	Type5		1. Encoder signal A, B, Z for difference drive output (output through 26LS31, corresponding to RS422 ); 2. Non-isolative output (non-insulation).	
16		PhaseA —				
8	Encoder phase-B	PhaseB +	Type5			
17		PhaseB —				

	signal				
9	Encoder phase- Z signal	PhaseZ +	Type5		
18		PhaseZ -			

### 3.4 Line-Line Serial Terminal COM/CN3

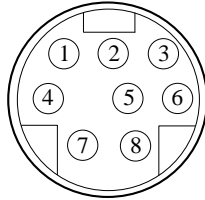


Figure 3-4 Serial-line terminal plug CN3

#### ■ RS-232

Terminal number	Name	Function	
		Symbol	Description
3	Receive data	RXD	Receive data signal.
5	Transmit data	TXD	Transmit data signal.
1	GND	GND	Inhibit signal earth.

#### ■ RS-485

Terminal number	Name	Function	
		Symbol	Description
8	Difference signal Data+	Data+	Data+ terminal
7	Difference signal Data-	Data-	Data- terminal
1	GND	GND	Inhibit signal earth.

### 3.5 I/O Interface Type

#### 3.5.1 Switching Input Interface

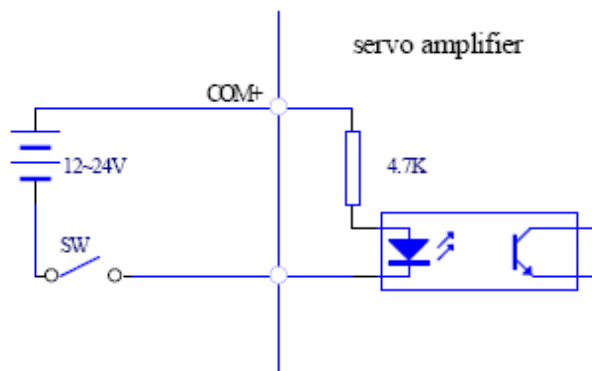


Figure 3-5 Type1 Switching input interface

- (1) Power supply provided by customers, DC12~24V, current $\geq$ 100mA;
- (2) Servo drive could not work in the event of the reversed polarity for power supply.

#### 3.5.2 Switching Output Interface

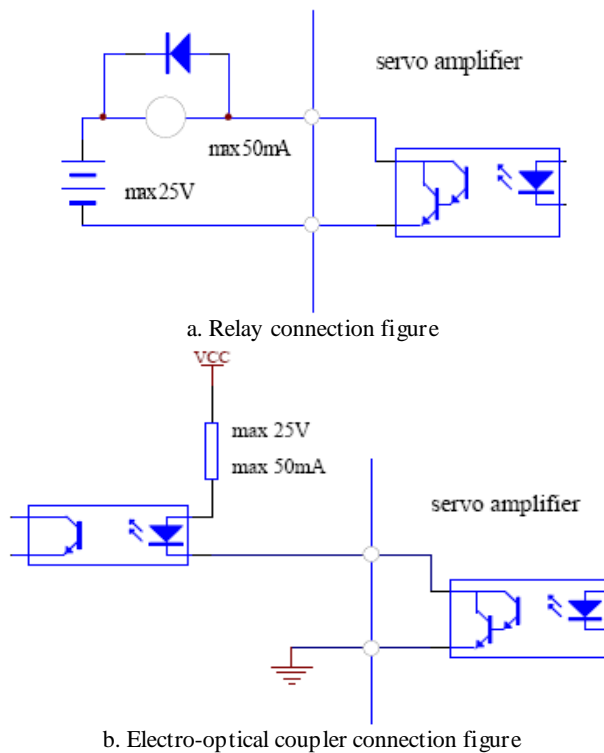


Figure 3-6 Type2 switching output interface

- (1) The output is the Darlington transistor, with relay or electro-optical coupler connection;
- (2) The external power supply provided by users may damage the drive because of the reversed polarity;
- (3) The output works in collecting electrode opening form, the maximum current is up to 50mA while the maximum external voltage is 25V. Therefore, the switch output signal's load must satisfy this definition request. If it surpasses the definition request or the output is directly connected with the power supply will cause damage.
- (4) Users should connect inverse parallel freewheel diode in case of the inductive load such as relays. If the freewheel diode is reversed, servo drive may be damaged;
- (5) As Darlington transistor is used for output, as breakover, the pressure drop( $V_{ce}$ ) between collector and launch is about 1V which could not meet the low-level requirements, so it could not be connected with TTL integrated circuits directly.

### 3.5.3 Pulse Input Interface

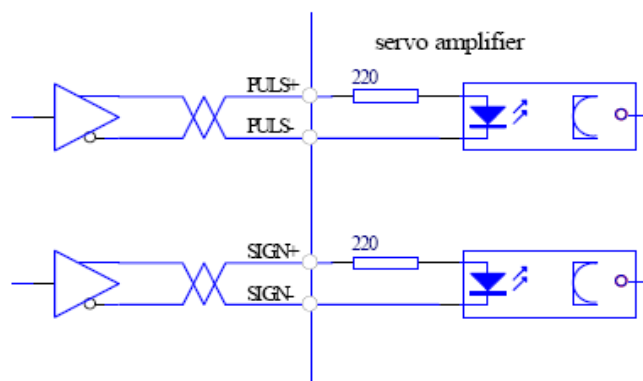


Figure 3-7 difference drive mode for type3 pulse input interface

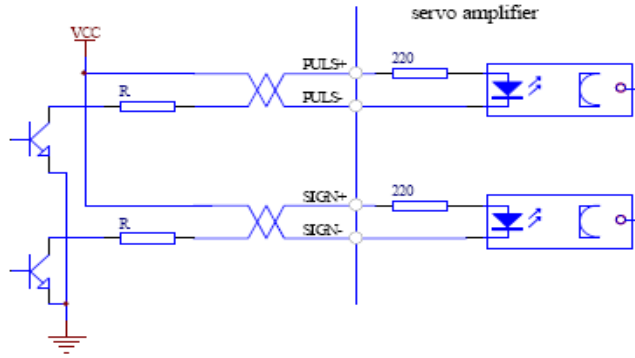


Figure 3-8 single-ended drive mode for Type3 pulse input interface

- (1) To transmit the pulse correctly, it is suggested to use the difference drive type.
- (2) Using AM26LS31, MC3487 or similar RS422 drive in difference drive mode.
- (3) Action frequency will be reduced as using single-ended drive mode. According to the pulse input circuit, the drive current is 10 to 15mA and limitation for external maximum voltage is 25V to determinate the resistance R. Empirical data: VCC=24V, R=1.3~2kΩ; VCC=12V, R=510~820Ω; VCC=5V, R=82~120Ω.
- (4) External power is provided by users as adopting single-ended drive, and the servo drive may be damaged because of the anti-polarity.
- (5) Table 3-1 for pulse input mode, Table 3-2 for pulse input timing and parameter. When operating in 2-phase input mode, its 4 times pulse frequency will be less than 500 kHz.

Table 3-1 Pulse input mode

Pulse command	CCW	CW	Setting value for parameters
pulse train	PULS	PULS	0
symbol	SIGN	SIGN	Command pulse+symbol
CCW pulse train	PULS	PULS	1
CW pulse train	SIGN	SIGN	CCW pulse/CCW pulse
Phase-A pulse train	PULS	PULS	2
Phase-B pulse train	SIGN	SIGN	2-phase command pulse

Table 3-2 Pulse input mode timing and parameter

Parameter	Difference drive input	Single-ended drive input
$t_{ck}$	$>2\mu S$	$>5\mu S$
$t_h$	$>1\mu S$	$>2.5\mu S$
$t_l$	$>1\mu S$	$>2.5\mu S$
$t_{rh}$	$<0.2\mu S$	$<0.3\mu S$
$t_{rl}$	$<0.2\mu S$	$<0.3\mu S$
$t_s$	$>1\mu S$	$>2.5\mu S$
$t_{qck}$	$>8\mu S$	$>10\mu S$
$t_{qh}$	$>4\mu S$	$>5\mu S$
$t_{ql}$	$>4\mu S$	$>5\mu S$
$t_{qrh}$	$<0.2\mu S$	$<0.3\mu S$
$t_{qrl}$	$<0.2\mu S$	$<0.3\mu S$
$t_{qs}$	$>1\mu S$	$>2.5\mu S$

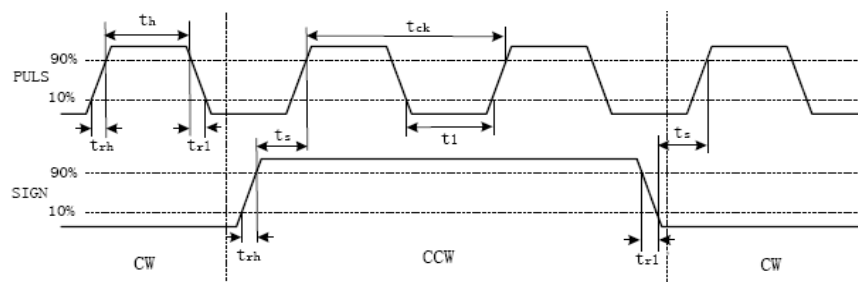


Figure 3-9 Pulse and symbol input interface timing chart (The maximum pulse frequency: 500 kHz)

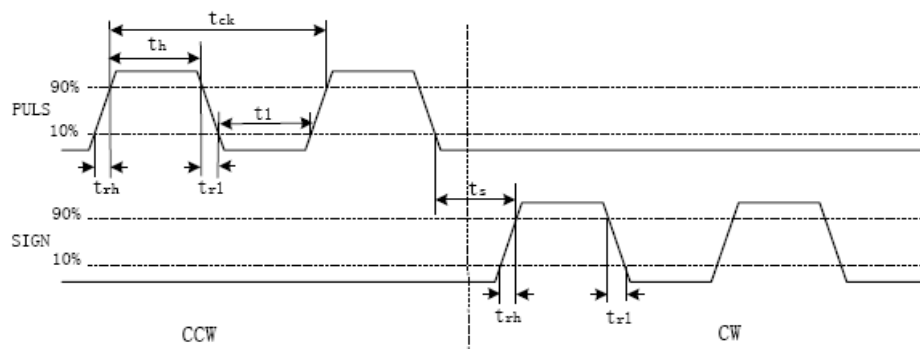


Figure 3-10 CCW /CW pulse input interface timing chart (The maximum pulse frequency: 500 kHz)

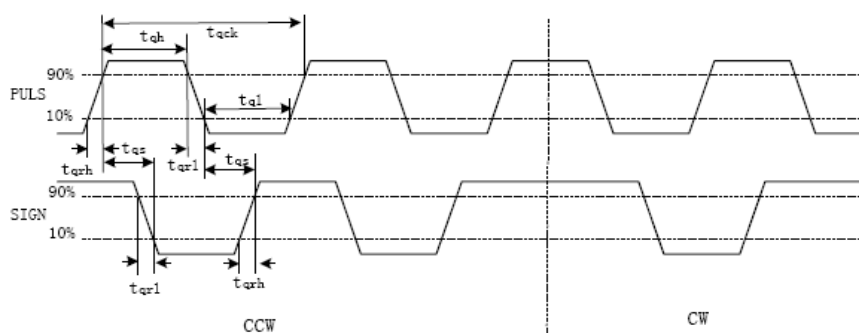


Figure 3-11 2-phase command pulse input interface timing chart (The maximum pulse frequency: 125 kHz)

### 3.5.4 Analog Input Interface

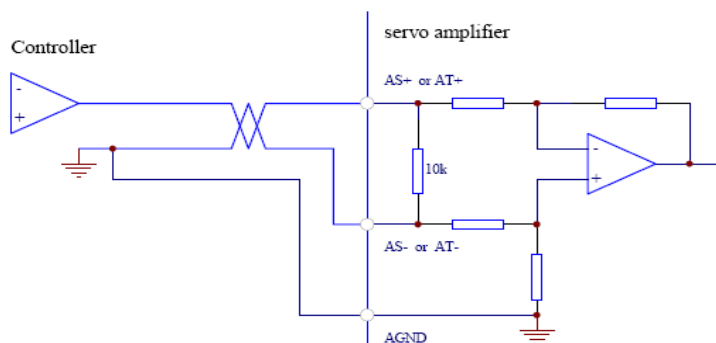


Figure 3-12 (a) Difference analog input interface (type4)



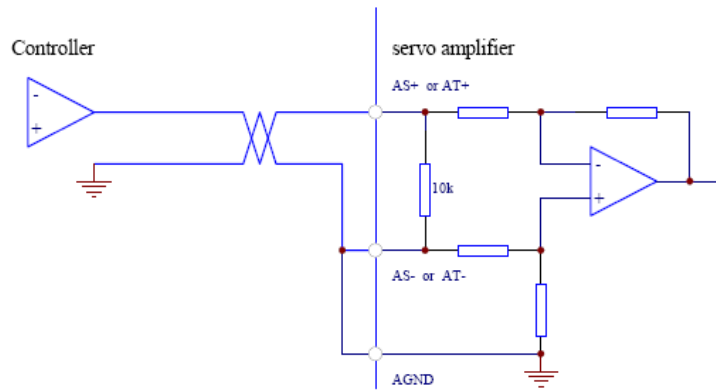


Figure 3-12 (b) Single-ended analog input interface (type4)

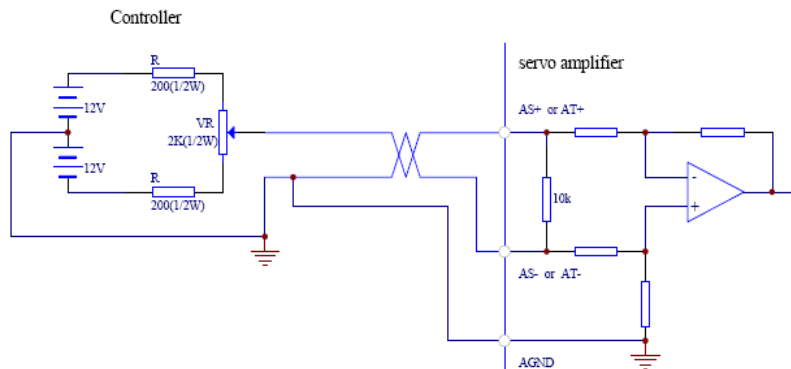


Figure 3-12 (c) Difference analog potentiometer input interface (type4)

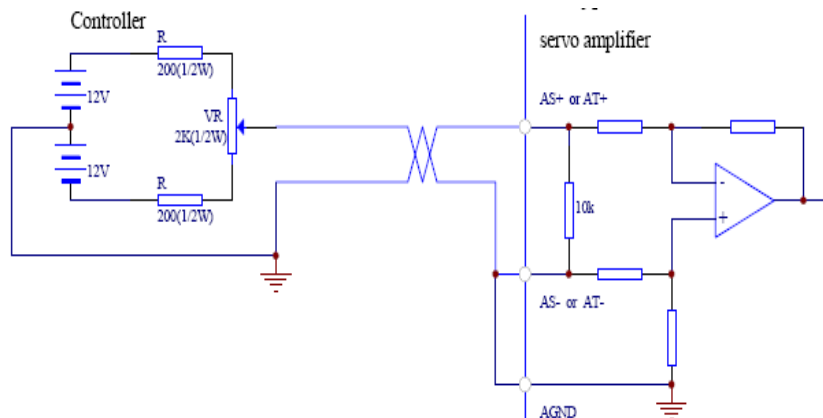


Figure 3-12 (d) Single-ended analog potentiometer input interface (type4)

- (1) Analog input interface works in difference mode, there are two modes according to the connection: difference mode and single-ended mode, the input impedance is 10kΩ and the range of input voltage is -10V~+10V;
- (2) In the difference connection, the analog grounding and input negative end should be connected at the controller side, needing three line connections from the controller to the driver;
- (3) In the single end connection, the analog grounding and input negative end should be connected at the drive side, needing two line connections from the controller to the driver;
- (4) Difference mode which could suppress common code interference performances better than single-ended mode;
- (5) Drive may be damaged on condition that input voltage exceeds the range of -10~+10;
- (6) It is suggested to connect with inhibit cable to reduce noise interference;
- (7) It is normal that there is zero-bias at the analog input interface, you can compensate it by adjusting PN16 or PN19;
- (8) Analog interface is non-insulated.

### 3.5.5 Encoder Signal Output Interface

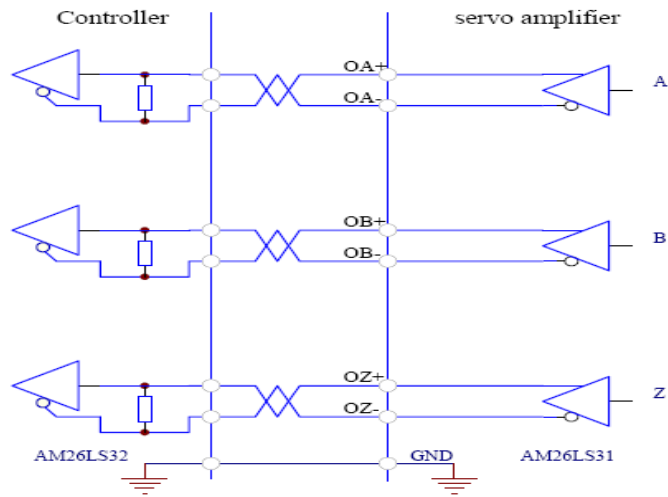


Figure 3-13 a Optical encoder output interface (Type5)

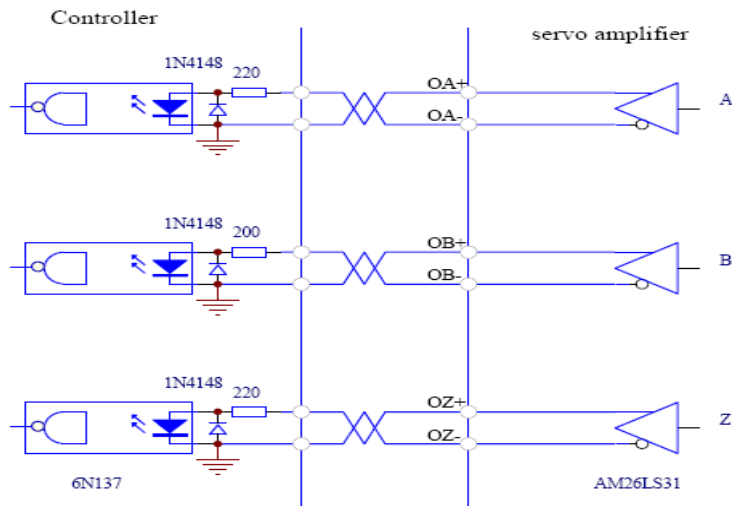


Figure 3-13 b Optical encoder output interface (Type5)

- (1) AM26LS31 outputs encoder signals;
- (2) AM26LS32 is used as the input end of the controller, it is necessary to connect a terminal resistor about 330Ω (Figure 3-13 a);
- (3) The grounding line of controller and servo drive must be connected reliably;
- (4) Non-isolative output (non-insulative).
- (5) A high speed electro-optical coupler can be used as the controller input instead (Figure3-13 b).

### 3.5.6 Open Collector Output Interface for Encoder Phase-Z Signal

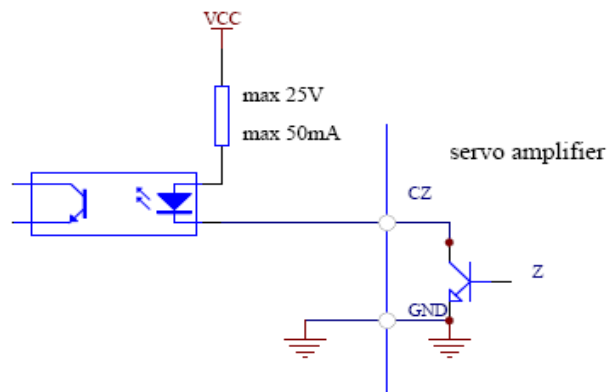


Figure 3-14 Optical encoder output interface (Type6)

- (1) Phase-Z signal is output through open collector, when Phase-Z signal appears, outputs ON, otherwise, outputs OFF;
- (2) Non-isolative output (non-insulative).
- (3) Please use a high speed electro-optical coupler to receive the signal.

### 3.5.7 Optical Encoder Input Interface for Servo Motor

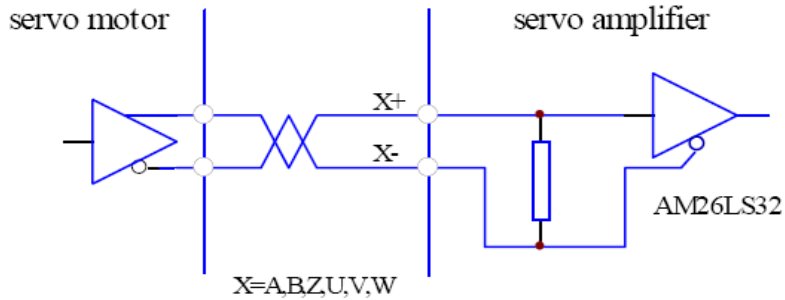


Figure 3-15 Servo motor optical encoder input interface

## Chapter 4 Operation

### 4.1 Operation Procedure

Item	Content
Mounting and installation	Install the motor and servo drive according to the installation conditions. (Do not connect the motor to the mechanical system before checking the no-load operation.)
↓	
Wiring and connections	Connect to power supply and peripheral devices. Specified installation and wiring requirements must be satisfied.

↓	
Preparing for operation	Before turning ON the power supply, check the necessary items. Check by means of the displays to see whether there are any internal errors.
↓	
Checking operation	Check the operation of the motor and servo driver alone by performing a jogging operation without a load.
↓	
Function settings	By means of the user parameters, set the functions according to the operating conditions.
↓	
Trial operation	Turn on the power, and check whether protective functions such as emergency stop and operational limits are working reliably. Check operation at both low speed and high speed (using instructions from the Host Controller).
↓	
Adjustments	Manually adjust the gain as required. Further adjust the various functions to further improve the control performance as required.
↓	
Operation	Operation can now begin. If any trouble occurs, refer to <i>Chapter 6 Troubleshooting</i> .

## 4.2 Preparing For Operation

### 4.2.1 Turning Power ON and Checking Indicators

#### ■ Checking Power Supply Voltage

- Check to be sure that the power supply voltage is 48~80VDC

#### ■ Checking Terminal Block Wiring

- The power supply inputs (+VDC, GND) must be properly connected to the terminal block.
- The servo motor's power line (U, V, W) must be properly connected to the terminal block.

#### ■ Checking the servo motor

- The Encoder Cable must be securely connected to the Encoder Connector at the motor side.
- The power lines at the servo motor must be securely connected.

#### ■ Checking the Control Connectors

- The Control Cable must be securely connected to the I/O Control Connector (CN2).
- The ServoEn command must be OFF

## 4.3 Position Control Mode

- Perform position control using the pulse train input from PulseInv+(CN2-Pin32), PulseInv-(CN2-Pin33), **SignInv+** (CN2-Pin34), **SignInv-** (CN2-Pin35).
- The servo motor rotates using the value of the pulse train input multiplied by the electronic gear (Pn48, Pn49, Pn50)

- The encoder line is 2500C/T, users can get feedback signals A+ (CN2-Pin7)、A- (CN2-Pin16)、B+ (CN2-Pin8)、B- (CN2-Pin17)、Z+ (CN2-Pin9)、Z- (CN2-Pin18) through CN2.

### 4.3.1 Parameters In Position Control Mode

No.	Parameter	Function
4	Motor control mode	Select the control mode of servo drive.(Set the parameter to 2 for position control mode)
48	Denominator of position gearbox	The electronic gear ratio is $G = \frac{N \times C \times 4}{P}$ G: Electronic gear ratio;P: Input command pulse number;N: The revolving circle of the motor; C: The photoelectric encoder C/T, this system is C=2500. Recommendatory range of electronic gear ratio: $\frac{1}{50} \leq G \leq 50$
49	Divider numerator of the first position command pulse	
52	Position command pulse input mode	Set the parameter to match with the controller command pulse status.
53	Invert direction of position command pulse	Select the rotation direction
54	Positioning completed range	If the position error drops in the target position range, the output terminal COIN turns active, otherwise COIN remains inactive.
55	Range of position super-homodyne detection	The drive will issue position tolerance alarm when the position offset counter value exceeds the selected value×100 in position control mode.
56	Enable position error	Set the parameter select using the position tolerance alarm or not.
57	Position pulse feedback ratio	The feedback ratio of position pulse determines the ratio of the internal and output position pulse.

### 4.3.2 Operation

- Connect the servo system correctly and turn on the power supply.
- Select the command pulse type and rotation direction.
  - Set Pn52 to choose position command pulse type. Set Pn52 to 0, the position command type is pulse and symbol; set Pn52 to 1, the position command type is CW/CCW pulse; set Pn52 to 2, the position command type is two-phase orthogonal pulse.
  - Set Pn53 to select the rotation direction. (0 for normal rotation direction and 1 for the opposite rotation direction)
- Select electronic gear ratio.  
Set Pn48, Pn49 to select proper electronic gear ratios.
- Running.  
Set Pn4 to 2 to select position control mode, set ServoEn(ServoEn+: CN2-Pin20; ServoEn-: CN2-Pin19) ON. Users can adjust the input pulse to control the motor.
- Other functions.
  - Positioning completed: In position control mode, if the position error drops in the target position range, the output terminal COIN turns active, otherwise COIN remains inactive.
  - Position error function: Set Pn56 to 0, position tolerance alarm detection is enabled; Set Pn56 to 1, position tolerance alarm detection is disabled and position tolerance error detection is stopped.
  - Position pulse feedback ratio: The feedback ratio of position pulse determines the ratio of the internal and output position pulse: the parameter is a decimal number, change it into a binary, we divide the binary into two parts, the high-5-bit value is the numerator while the low-5-bit is the denominator, then the fraction is the feedback ratio (Normal setting: 33 (00001\_00001) for 1:1; 34 (00001\_00010) for 1:2; 36 (00001\_00100) for 1:4; 37 (00001\_00101) for 1:5; 42 (00001\_01010) for 1:10 ).

## 4.4 Speed Mode

- Internal speed mode

- ①Set parameters (Pn 36) to select internal speed.
- ②Set time constant of linear speed acceleration/ deceleration.
- External speed mode
  - ①Set analog voltage input as the speed command(ASPEED+: CN2+Pin24; ASPEED-: CN2-Pin25).
  - ②Select a proper bias compensation for a perfect performance.

#### 4.4.1 Parameters In Speed Control Mode

No.	Parameter	Function
4	Motor control mode	Select the control mode of servo drive.(Set the parameter to 1 for speed control mode)
18	Gain of analog speed command input	Set the ratio between the input voltage of analog speed and actual motor speed.(Effective in external speed mode)
19	The bias compensation of analog speed input	The zero-bias compensation for the analog speed input.(Effective in external speed mode)
20	Invert enable of analog speed input	Set the rotation direction.(Effective in external speed mode)
21	Low-pass bandwidth of analog speed input	Set the response time of speed analog input.
34	Time constant of linear speed acceleration	Set the time constant of linear speed acceleration(Effective in internal speed mode).
35	Time constant of linear speed deceleration	Set the time constant of linear speed deceleration (Effective in internal speed mode).
36	Internal speed 1	Set internal speed.
40	Internal or external speed command selection	Select internal or external speed command to control the motor.
42	Peak speed limitation	Set the maximum speed limitation of servo motor.
43	Target speed	In speed control mode, if the motor speed exceeds the selected value, then COIN turns to ON, otherwise COIN remains OFF.

#### 4.4.2 Operation

1. Connect the servo system correctly and turn on the power supply.
2. Limitation of acceleration/ deceleration and maximum speed.
  - ①Set Pn34 and Pn35 to select the acceleration time constant and the deceleration time constant.
  - ②Set Pn42 to select the maximum speed.
3. Operation in internal speed mode.  
Set Pn40 to 0 to select internal speed control mode, there is only one internal speed (Pn36).
4. Operation in external speed mode.  
Set Pn40 to 1 to select external speed control mode, users can adjust the external input command to control the motor. In external speed control mode, users can select Pn18 to set analog speed input gain (for example, the default value is 100, it means 10V input stands for 3000rpm). Set Pn20 to select the rotation direction (0 for reverse rotation (CW) direction and 1 for forward rotation (CCW) direction when the value of Pn15 is a positive number).  
Set Pn4 to 1 to select speed control mode, then set ServoEn (ServoEn+: CN2-Pin20; ServoEn-: CN2-Pin19) ON, users can adjust the external input command to control the motor, and set Pn19 to rectify the speed command for an accurate value.
5. Other functions.  
Target speed: Set Pn43 to a proper value, as the current speed is over or the same with the selected value, the signal “COIN” will turn to ON.  
Zerospeed: This function is effective in external speed mode. Set ZEROSPD(CN2-Pin14) ON, speed command would be invalid, and the motor would not move; set ZEROSPD OFF, speed command would be effective, and the motor would run at selected speed.

## 4.5 Torque Control Mode

- Set analog voltage input as the torque command(ATORQUE+: CN2-Pin24; ATORQUE-: CN2-Pin25).
- Select a proper bias compensation for a perfect performance.

### 4.5.1 Parameters In Torque Control Mode

No.	Parameter	Function
4	Motor control mode	Select the control mode of servo drive.(Set the parameter to 0 for torque control mode)
15	Gain of analog torque command input	Set proportion relationship between analog torque input voltage and actual motor torque.
16	The bias compensation of analog torque input	The zero-bias compensation for the analog torque input.
17	Invert enable of analog torque input	Set the rotation direction.
22	Torque overload alarm value	Torque overload alarm value. The value is the percentage of nominal torque which effects both direction
23	Torque overload testing time	Torque overload alarm test time.
25	Internal reverse rotation (CW) torque limit	Used to limit the torque in the reverse rotation driving mode.
26	Internal forward rotation (CCW) torque limit	Used to limit the torque in the forward rotation driving mode.
29	Speed limit during torque control	Limit the maximum speed in torque control mode.

### 4.5.2 Operation

1. Connect the servo system correctly and turn on the power supply.
2. Torque command.
  - ①Set Pn15 to a proper value (Associated with the external input power) to select the analog torque input gain (For example, the default value is 100, it means 10V input stands for nominal torque).
  - ②Set Pn17 to select the rotation direction (0 for reverse rotation (CW) direction and 1 for forward rotation (CCW) direction when the value of Pn15 is a positive number).
3. Limitation of speed and torque.
  - ①Set Pn29 and Pn42 to select the maximum speed in torque control mode (The current speed is limited by both Pn29 and Pn42).
  - ②Set Pn25, Pn26, Pn27, Pn28 to select the maximum torque, the actual torque will be limited less than the selected value. As using internal torque limit function, users can directly select parameter Pn25, Pn26 to limit the torque; as using external torque limit function, users need to connect CCWTLtd(CN2-Pin16), CWTLtd(CN2-Pin17) for external torque limit function. Set Pn27 and Pn28 to proper value, set the digital signal ON when users want to use the function.
4. Running.

Set Pn4 to 0 to select torque control mode, then set ServoEn (CN2-Pin 10) ON. Users can adjust the external input command to control the motor, and set Pn16 to rectify the torque command for an accurate value.
5. Other functions.

Overtorque alarm function: Set Pn22 and Pn23 to send an alarm as overtorque.

## 4.6 Gain Adjustment

- Adjust the gain parameters in order to get a perfect performance.
- The wrong parameter settings may lead to equipment failure and accidents, users should confirm the correctness of the parameters before operation.
- It is suggested that operate without load for testing first.

#### 4.6.1 Speed Loop

■ Speed loop gain (Parameter-Pn30)

The larger the value is, the greater the stiffness would be. The value is determined by the type of servo and the load condition. In general, larger load inertia needs larger value. If there is no oscillation, the larger the value is the better the servo system performs.

■ Speed loop integral time constant (Parameter-Pn31)

The smaller the value is, the greater the stiffness is. The value is determined by the type of servo and the load condition. In general, larger load inertia needs larger value. Set the parameter as small as possible without oscillation.

■ Low-pass bandwidth of speed loop (Parameter-Pn32)

Normally, smaller value results in slower and smoother speed response. Too small value may cause system oscillation.

■ Low-pass filter bandwidth of torque command (Parameter-Pn33)

Normally, smaller value results in slower and smoother speed response. But too much small value may cause system oscillation.

#### 4.6.2 Position Loop

■ Position loop gain (Parameter-Pn44)

Higher gain results in greater mechanical stiffness and less position tracking error. Too large value may cause overshoot or oscillation. The value is determined by the type and the load of servo drive.

■ Difference coefficient ratio of position loop (Parameter-Pn45)

Higher gain results in greater mechanical stiffness and less position tracking error. Too big value may cause overshoot or oscillation; This parameter is usually set to zero unless very fast response is required.

■ The cut-off frequency of position feed forward filter (Parameter-Pn46)

The filter is used to increase the stability of compound position control. Normally, users do not need to change the default value.

#### 4.6.3 Parameters Settings

■ The default parameter value is the recommended value in condition that operating without load, users can adjust parameters follow the instructions below.

■ As the load inertia increases, the maximum value of Pn30 rises, the minimum value of Pn31 increased, Pn32 did not change significantly, Pn33 could remain unchanged, the maximum value of Pn44 reduces.

■ As load inertia rises from 1 time to 5 times, Pn30 roughly increases the proportion of 1 ~ 5 times (Pn31 remain unchanged); Pn44 roughly reduces the proportion of 1 ~ 5 times.

■ As the load inertia increases, it may lead to oscillation (whistle), users can reduce the response rate to solve the problem (increase Pn31 or reduce Pn32; recommended that Pn31 rises 50%, reduce Pn32).



## Chapter 5 Parameters

### Warning

- Any person who attempts to adjust the parameters should be very familiar with the drive. Inappropriate parameter settings may cause damage to the operator.
- It is strongly recommended that operate the servo system without saving as modifies the parameters at the first time.

### 5.1 Parameter List

NO.	Parameter	Mode	Range	Default value	Unit
0	Software edition	P, S, T	—	—	
1	Motor type code	P, S, T	0~21	—	
2	User constants protection code	P, S, T	0~32767	28977	
3	Display mode	P, S, T	0~18	0	
4	Motor control mode	P, S, T	0~6	5	

5	Mechanical brake delay time	P, S, T	1~1000	10	ms
6	Current turn off delay time	P, S, T	1~1000	10	ms
7	Mechanical brake speed	P, S, T	0~6000	30	rpm
8	Anti-control of low-6-bit input terminal for PC interface	P, S, T	0~63	0	
9	Anti-control of high-4-bit input terminal for PC interface	P, S, T	0~15	0	
10	Anti-control of encoder input terminals	P, S, T	0~63	0	
11	Force-ON of low-6-bit input terminal for PC interface	P, S, T	0~63	0	
12	Force-ON of high-4-bit input terminal for PC interface	P, S, T	0~15	0	
13	Anti-control of high-4-bit output ports for PC interface	P, S, T	0~15	0	
14	Anti-control of low-3-bit output ports for PC interface	P, S, T	0~7	0	
15	Gain of analog torque command input	T	10~300	100	
16	The bias compensation of analog torque input	T	-30000~30000	0	mV
17	Invert enable of analog torque input	T	0~1	0	
18	Gain of analog speed command input	S	10~300	100	
19	The bias compensation of analog speed input	S	-30000~30000	0	mV
20	Invert enable of analog speed input	S	0~1	0	
21	Low-pass bandwidth of analog speed input	S	0~1000	300	Hz
22	Torque overload alarm value	T	1~400	—	
23	Torque overload testing time	T	1~32767	—	ms
24	Internal brake resistor temperature alarm	P, S, T	0~1	1	
25	Internal reverse rotation (CW) torque limit	P, S	1 ~ 400	300	
26	Internal forward rotation (CCW) torque limit	P, S	1 ~ 400	300	
27	External CW torque limit(NOT Support)	P, S	1 ~ 400	100	
28	External CCW torque limit(NOT Support)	P, S	1 ~ 400	100	
29	Speed limit during torque control	T	0~3000	2000	rpm
30	Speed loop gain	S	1~8000	—	
31	Speed loop integral time constant	S	1~8000	—	
32	Low-pass bandwidth of speed loop	S	1~1000	500	Hz
33	Low-pass filter bandwidth of torque command	T	50~1000	800	Hz
34	Time constant of linear speed acceleration	P, S, T	0~10000	0	0.1s
35	Time constant of linear speed deceleration	P, S, T	0~10000	0	0.1s
36	Internal speed 1	S	-6000~6000	1500	rpm
37	Internal speed 2(NOT Support)	S	-6000~6000	1500	rpm
38	Internal speed 3(NOT Support)	S	-6000~6000	1500	rpm
39	Internal speed 4(NOT Support)	S	-6000~6000	1500	
40	Internal or external speed command selection	S	0~1	0	
41	Speed setting in JOG mode (NOT Support)		0~3000	1500	rpm
42	Peak speed limitation	P, S, T	0~6000	3000	rpm

43	Target speed	S, T	1~6000	1500	rpm
44	Position loop gain	P	1~10000	—	
45	Difference coefficient ratio of position loop	P	0~8000	—	
46	The cut-off frequency of position feed forward filter	P	1~300	100	Hz
47	Constant of position command filter	P	0~1000	0	
48	Denominator of position gearbox	P	1~30000	20	
49	Divider numerator of the 1nd position command pulse	P	1~30000	20	
50	Divider numerator of the 2nd position command pulse(NOT Support)	P	1~30000	20	
51	Dynamic electronic gear enable(NOT Support)	P	0~1	0	
52	Position command pulse input mode	P	0~2	0	
53	Invert direction of position command pulse	P	0~1	0	
54	Positioning completed range	P	0~30000	1	
55	Range of position super-homodyne detection	P	1~30000	30000	
56	Enable position error	P	0~1	1	
57	Position pulse feedback ratio	P	0~3	0	
58	Home position(NOT Support)		0~2	0	
59	Homing speed(NOT Support)		1~6000	100	rpm
60	Homing acceleration/ deceleration speed(NOT Support)		1~1000	50	R / (s*s)
61	High bit of home offset(NOT Support)		-30000~30000	0	
62	Low bit of home offset(NOT Support)		-9999~9999	0	
63	Demo or point-to-point mode(NOT Support)		0~4	2	
64	Torque value 1 in torque mode(NOT Support)		-400~400	10	
65	Demo time 1 in torque mode(NOT Support)		0~3600	60	s
66	Torque value 2 in torque mode(NOT Support)		-200~200	-10	
67	Demo time 2 in torque mode(NOT Support)		0~3600	60	s
68	Torque value 3 in torque mode(NOT Support)		-200~200	20	
69	Demo time 3 in torque mode(NOT Support)		0~3600	60	s
70	Torque value 4 in torque mode(NOT Support)		-200~200	-20	
71	Demo time 4 in torque mode(NOT Support)		0~3600	60	s
72	Torque value 5 in torque mode(NOT Support)		-200~200	30	
73	Demo time 5 in torque mode(NOT Support)		0~3600	60	s
74	Torque value 6 in torque mode(NOT Support)		-200~200	-30	
75	Demo time 6 in torque mode (NOT Support)		0~3600	60	s
76	Torque value 7 in torque mode(NOT Support)		-200~200	80	
77	Demo time 7 in torque mode(NOT Support)		0~3600	60	s
78	Torque value 8 in torque mode(NOT Support)		-200~200	-80	
79	Demo time 8 in torque mode(NOT Support)		0~3600	60	s
80	Torque value 9 in torque mode(NOT Support)		-200~200	100	
81	Demo time 9 in torque mode(NOT Support)		0~3600	60	s

82	Torque value 10 in torque mode(NOT Support)		-200~200	-100	
83	Demo time 10 in torque mode(NOT Support)		0~3600	60	s
84	Speed value 1 in speed mode(NOT Support)		-6000~6000	10	rpm
85	Demo time 1 in speed mode(NOT Support)		0~3600	60	s
86	Speed value 2 in speed mode(NOT Support)		-6000~6000	50	rpm
87	Demo time 2 in speed mode(NOT Support)		0~3600	60	s
88	Speed value 3 in speed mode(NOT Support)		-6000~6000	250	rpm
89	Demo time 3 in speed mode(NOT Support)		0~3600	60	s
90	Speed value 4 in speed mode(NOT Support)		-6000~6000	1250	rpm
91	Demo time 4 in speed mode(NOT Support)		0~3600	60	s
92	Speed value 5 in speed mode(NOT Support)		-6000~6000	2500	rpm
93	Demo time 5 in speed mode(NOT Support)		0~3600	60	s
94	Speed value 6 in speed mode(NOT Support)		-6000~6000	-10	rpm
95	Demo time 6 in speed mode(NOT Support)		0~3600	60	s
96	Speed value 7 in speed mode(NOT Support)		-6000~6000	-50	rpm
97	Demo time 7 in speed mode(NOT Support)		0~3600	60	s
98	Speed value 8 in speed mode(NOT Support)		-6000~6000	-250	rpm
99	Demo time 8 in speed mode(NOT Support)		0~3600	60	s
100	Speed value 9 in speed mode(NOT Support)		-6000~6000	-1250	rpm
101	Demo time 9 in speed mode(NOT Support)		0~3600	60	s
102	Speed value 10 in speed mode(NOT Support)		-6000~6000	-2500	rpm
103	Demo time 10 in speed mode(NOT Support)		0~3600	60	s
104	High bit of position command 1 in position mode(NOT Support)		-30000~30000	50	
105	Low bit of position command 1 in position mode(NOT Support)		-9999~9999	0	
106	Speed of position command 1 in position mode(NOT Support)		0~6000	2000	
107	Acceleration/deceleration of position command 1 in position mode(NOT Support)		1~1000	25	R / (s*s)
108	Peak torque of position command 1 in position mode(NOT Support)		0~400	125	NM
109	High bit of position command 2 in position mode(NOT Support)		-30000~30000	10	
110	Low bit of position command 2 in position mode(NOT Support)		-9999~9999	0	
111	Speed of position command 2 in position mode(NOT Support)		0~6000	2000	
112	Acceleration / deceleration of position command 2 in position mode(NOT Support)		1~1000	25	
113	Peak torque of position command 2 in position mode(NOT Support)		0~400	125	NM
114	High bit of position command 3 in position mode(NOT Support)		-30000~30000	90	
115	Low bit of position command 3 in position mode(NOT Support)		-9999~9999	0	
116	Speed of position command 3 in position mode(NOT Support)		0~6000	2000	

	Support)				
117	Acceleration / deceleration of position command 3 in position mode(NOT Support)		1~1000	25	
118	Peak torque of position command 3 in position mode(NOT Support)		0~400	125	N.M
119	High bit of position command 4 in position mode(NOT Support)		-30000~30000	20	
120	Low bit of position command 4 in position mode(NOT Support)		-9999~9999	0	
121	Speed of position command 4 in position mode(NOT Support)		0~6000	2000	
122	Acceleration / deceleration of position command 4 in position mode(NOT Support)		1~1000	25	
123	Peak torque of position command 4 in position mode(NOT Support)		0~400	125	N.M
124	High bit of position command 5 in position mode(NOT Support)		-30000~30000	50	
125	Low bit of position command 5 in position mode(NOT Support)		-9999~9999	0	
126	Speed of position command 5 in position mode(NOT Support)		0~6000	2000	
127	Acceleration / deceleration of position command 5 in position mode(NOT Support)		1~1000	25	
128	Peak torque of position command 5 in position mode(NOT Support)		0~400	125	N.M
129	High bit of position command 6 in position mode(NOT Support)		-30000~30000	80	
130	Low bit of position command 6 in position mode(NOT Support)		-9999~9999	0	
131	Speed of position command 6 in position mode(NOT Support)		0~6000	2000	
132	Acceleration / deceleration of position command 6 in position mode(NOT Support)		1~1000	25	
133	Peak torque of position command 6 in position mode(NOT Support)		0~400	125	N.M
134	High bit of position command 7 in position mode(NOT Support)		-30000~30000	50	
135	Low bit of position command 7 in position mode(NOT Support)		-9999~9999	0	
136	Speed of position command 7 in position mode(NOT Support)		0~6000	2000	
137	Acceleration / deceleration of position command 7 in position mode(NOT Support)		1~1000	25	
138	Peak torque of position command 7 in position mode(NOT Support)		0~400	125	N.M
139	High bit of position command 8 in position mode(NOT Support)		-30000~30000	30	
140	Low bit of position command 8 in position mode(NOT Support)		-9999~9999	0	
141	Speed of position command 8 in position mode(NOT Support)		0~6000	2000	
142	Acceleration / deceleration of position command 8 in position mode (NOT Support)		1~1000	25	
143	Peak torque of position command 8 in position mode(NOT Support)		0~400	125	N.M
144	High bit of position command 9 in position mode(NOT Support)		-30000~30000	10	
145	Low bit of position command 9 in position mode(NOT Support)		-9999~9999	0	
146	Speed of position command 9 in position mode(NOT Support)		0~6000	2000	
147	Acceleration / deceleration of position command 9 in position mode(NOT Support)		1~1000	25	
148	Peak torque of position command 9 in position mode(NOT Support)		0~400	125	N.M

149	High bit of position command 10 in position mode(NOT Support)		-30000~30000	80	
150	Low bit of position command 10 in position mode(NOT Support)		-9999~9999	0	
151	Speed of position command 10 in position mode(NOT Support)		0~6000	2000	
152	Acceleration / deceleration of position command 10 in position mode(NOT Support)		1~1000	25	
153	Peak torque of position command 10 in position mode(NOT Support)		0~400	125	N.M
154	High bit of position command 11 in position mode(NOT Support)		-30000~30000	50	
155	Low bit of position command 11 in position mode(NOT Support)		-9999~9999	0	
156	Speed of position command 11 in position mode(NOT Support)		0~6000	2000	
157	Acceleration / deceleration of position command 11 in position mode(NOT Support)		1~1000	25	
158	Peak torque of position command 11 in position mode(NOT Support)		0~400	125	N.M
159	High bit of position command 12 in position mode(NOT Support)		-30000~30000	60	
160	Low bit of position command 12 in position mode(NOT Support)		-9999~9999	0	
161	Speed of position command 12 in position mode(NOT Support)		0~6000	2000	
162	Acceleration / deceleration of position command 12 in position mode(NOT Support)		1~1000	25	
163	Peak torque of position command 12 in position mode(NOT Support)		0~400	125	N.M
164	High bit of position command 13 in position mode(NOT Support)		-30000~30000	30	
165	Low bit of position command 13 in position mode(NOT Support)		-9999~9999	0	
166	Speed of position command 13 in position mode(NOT Support)		0~6000	2000	
167	Acceleration / deceleration of position command 13 in position mode(NOT Support)		1~1000	25	
168	Peak torque of position command 13 in position mode(NOT Support)		0~400	125	N.M
169	High bit of position command 14 in position mode(NOT Support)		-30000~30000	50	
170	Low bit of position command 14 in position mode(NOT Support)		-9999~9999	0	
171	Speed of position command 14 in position mode(NOT Support)		0~6000	2000	
172	Acceleration / deceleration of position command 14 in position mode(NOT Support)		1~1000	25	
173	Peak torque of position command 14 in position mode(NOT Support)		0~400	125	N.M
174	High bit of position command 15 in position mode(NOT Support)		-30000~30000	100	
175	Low bit of position command 15 in position mode(NOT Support)		-9999~9999	0	
176	Speed of position command 15 in position mode(NOT Support)		0~6000	2000	
177	Acceleration / deceleration of position command 15 in position mode(NOT Support)		1~1000	25	
178	Peak torque of position command 15 in position mode(NOT Support)		0~400	125	N.M
179	High bit of position command 16 in position mode(NOT Support)		-30000~30000	50	
180	Low bit of position command 16 in position mode(NOT Support)		-9999~9999	0	
181	Speed of position command 16 in position mode(NOT Support)		0~6000	2000	

	Support)				
182	Acceleration / deceleration of position command 16 in position mode(NOT Support)		1~1000	25	
183	Peak torque of position command 16 in position mode(NOT Support)		0~400	125	N.M

## 5.2 Parameter Contents

NO	Parameter	Parameter description	Range
0	Firmware edition	Firmware edition of servo drive. Can't be modified by users.	—
1	Motor type code	The type code of motors;	0~21
2	User constants protection code	It is used to prevent the parameters from being changed accidentally. The parameters can be modified as the value is set to 28977. We suggest users to change it into a value other than 28977 after the parameters having been adjusted.	0~32767
3	Display mode	Select the information displaying on the panel: 0: Motor's current torque; 1: Motor's current speed; 2: Low-5-bit of current position; 3: High-5-bit of current position; 4: Torque command; 5: Speed command; 6: Low-5-bit of position command(command pulse accumulation); 7: High-5-bit of position command(command pulse accumulation); 8: Motor's current; 9: Counter of encoder output; 10: Linear speed; 11: Low-5-bit of position deviation; 12: High-5-bit of position deviation; 13: Control mode; 14: Alarm code; 15: States of low part input terminals in CN2; 16: States of high part input terminals in CN2; 17: State of output terminals in CN2; 18: State of the optical encoder in input terminals;	0~18
4	Motor control mode	①Select the control mode of servo drive: 0: Torque control mode; 1: Speed control mode; 2: Position control mode; 3: JOG control mode; 4: Speed trial operation control mode; 5: Auto-correction mode(used to correct ports and internal control parameter for motor); 6: Demo mode (Torque/Speed/Position)/point to point mode; ②In speed control mode, speed command transmits from input terminals (PN40).Set SC1 and SC2 to choose the internal speed: SC1 OFF, SC2 OFF: Internal speed 1; SC1 OFF, SC2 ON : Internal speed 2; SC1 ON , SC2 OFF: Internal speed 3; SC1 ON , SC2 ON : Internal speed 4; ③In position control mode, position command transmits from pulse input ports. ④In JOG control mode, press <b>[Up]</b> continuously, the motor is running at JOG speed, release the key, motor stops and keeps zero-speed; Press <b>[Down]</b> continuously, the motor is running in the reverse direction, release the key, motor stops and keeps zero-speed; ⑤In speed trial control mode, speed command is input from keyboard to test the drive and motor; ⑥In auto-correction mode, users can adjust the zero-compensation for analog torque and speed input port as well as the internal control parameters.	0~6
5	Mechanical brake delay time	①Set the delay time from the moment that mechanical brake available (output terminals BRK changes from OFF to ON) to the time motor current is cut off. ②This parameter should be bigger than mechanical braking delay time to	1~1000ms

		avoid motor for micro-displacement or falling.													
6	Current turn off delay time	<p>①Set the delay time from the moment the motor current is cut off to the time mechanical brake available (output terminals BRK changes from OFF to ON).</p> <p>②This parameter will protect the mechanical brake as the motor runs from a high speed to a low speed.</p> <p>③The actual time is the minimum value between PN5 and the time speed falls to PN6.</p>	1~1000ms												
7	Mechanical brake speed	<p>①Set the motor speed ensuring that mechanical brake is active (output terminal BRK changes from OFF to ON) when motor is running.</p> <p>②The actual time is the minimum value between PN5 and the time speed falls to PN6.</p>	0~6000												
8	Anti-control of low-6-bit input terminal for PC interface	<p>①Inverting enable of input terminals. Invert the input signal when the corresponding enable setting is active.</p> <p>②This parameter is expressed by a 6-bit binary number. 0 stands for original state, 1 stands for invert state. Here's a input terminal of binary number below:</p> <table><tr><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>ServoEn</td><td>AlarmClr</td><td>CCWDIs</td><td>CWDIs</td><td>CCWTLtd</td><td>CWTLtd</td></tr></table> <p>ServoEn: Servo enable; AlarmClr: Alarm clear; CCWDIs: CCW(counter-clockwise) drive forbidden; CWDIs: CW(clockwise) drive forbidden; CCWTLtd: CCW torque limited; CWTLtd: CW torque limited;</p>	5	4	3	2	1	0	ServoEn	AlarmClr	CCWDIs	CWDIs	CCWTLtd	CWTLtd	0~63
5	4	3	2	1	0										
ServoEn	AlarmClr	CCWDIs	CWDIs	CCWTLtd	CWTLtd										
9	Anti-control of high-4-bit input terminal for PC interface	<p>①Inverting enable of input terminals. Invert the input signal when the corresponding enable setting is active.</p> <p>②This parameter is expressed by a 4-bit binary number. 0 stands for original state, 1 stands for invert state. Here's a input terminal of binary number below:</p> <table><tr><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>CLE/SC1/ZEROSPD</td><td>INH/SC2</td><td>SignInv</td><td>PulseInv</td></tr></table> <p>CLE/SC1/ZEROSPD: Offset counter clear / Speed selector 1 / Zero clamp; INH/SC2: Command pulse forbidden (dynamic electronic gear switch) /Speed selector 2; SignInv: Position command pulse symbol bit; PulseInv: Position command pulse bit;</p>	3	2	1	0	CLE/SC1/ZEROSPD	INH/SC2	SignInv	PulseInv	0~15				
3	2	1	0												
CLE/SC1/ZEROSPD	INH/SC2	SignInv	PulseInv												
10	Anti-control of encoder input terminals	<p>①Inverting enable of input terminals. Invert the input signal when the corresponding enable setting is active.</p> <p>②This parameter is expressed by a 6-bit binary number. 0 stands for original state, 1 stands for invert state. Here's a input terminal of binary number below::</p> <table><tr><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>PhaseU</td><td>PhaseV</td><td>PhaseW</td><td>PhaseA</td><td>PhaseB</td><td>PhaseZ</td></tr></table> <p>Phase U: Photoelectric incremental encoder phase U; Phase V: Photoelectric incremental encoder phase V; Phase W:Photoelectric incremental encoder phase W; Phase A: Photoelectric incremental encoder phase A; Phase B: Photoelectric incremental encoder phase B; Phase Z: Photoelectric incremental encoder phase Z;</p>	5	4	3	2	1	0	PhaseU	PhaseV	PhaseW	PhaseA	PhaseB	PhaseZ	0~63
5	4	3	2	1	0										
PhaseU	PhaseV	PhaseW	PhaseA	PhaseB	PhaseZ										



11	Force-ON of low-6-bit input terminal for PC interface	<p>①Force the input signal active when the corresponding enable setting is active;</p> <p>②This parameter is expressed by a 6-bit binary number. 0 stands for the unforce-ON for input terminal, 1 stands for the force-ON for input terminal. Here's a input terminal of binary number below:</p> <table><tr><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>ServoEn</td><td>AlarmClr</td><td>CCWDIs</td><td>CWDIs</td><td>CCWTLtd</td><td>CWTLtd</td></tr></table> <p>ServoEn: Servo enable; AlarmClr: Alarm clear; CCWDIs: CCW(counter-clockwise) drive forbidden; CWDIs: CW(counter-clockwise) drive forbidden; CCWTLtd: CCW torque limited; CWTLtd : CW torque limited;</p>	5	4	3	2	1	0	ServoEn	AlarmClr	CCWDIs	CWDIs	CCWTLtd	CWTLtd	0~63
5	4	3	2	1	0										
ServoEn	AlarmClr	CCWDIs	CWDIs	CCWTLtd	CWTLtd										
12	Force-ON of high-4-bit input terminal for PC interface	<p>①External connection to control ON / OFF, for the terminal of force-ON, the drive can set ON automatically at internal without external connection.</p> <p>②This parameter is expressed by a 4-bit binary number. 0 stands for the unforce-ON for input terminal, 1 stands for the force-ON for input terminal. Here's a input terminal of binary number below:</p> <table><tr><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>CLE/SC1/ZEROSPD</td><td>INH/SC2</td><td>SignInv</td><td>PulseInv</td></tr></table> <p>CLE/SC1/ZEROSPD: Offset counter clear / Speed selector 1 / Zero clamp; INH/SC2: Command pulse forbidden (dynamic electronic gear switch) /Speed selector 2; SignInv: Position command pulse symbol bit; PulseInv: Position command pulse bit;</p>	3	2	1	0	CLE/SC1/ZEROSPD	INH/SC2	SignInv	PulseInv	0~15				
3	2	1	0												
CLE/SC1/ZEROSPD	INH/SC2	SignInv	PulseInv												
13	Anti-control of high-4-bit output ports for PC interface	<p>①Inverting enable of output terminals. For the anti-control terminal, turn-on and cut-off definition are opposited from standard definition.</p> <p>②This parameter is expressed by a 4-bit binary number. 0 stands for the no anti-control output terminal, 1 stands for the anti-control output terminal. Here's a input terminal of binary number below:</p> <table><tr><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>SRDY</td><td>ALM</td><td>COIN</td><td>BRK</td></tr></table> <p>SRDY: Servo ready; ALM: Servo alarm; COIN: Positioning complete / Reach speed BRK: Mechanical brake release.</p>	3	2	1	0	SRDY	ALM	COIN	BRK	0~15				
3	2	1	0												
SRDY	ALM	COIN	BRK												
14	Anti-control of low-3-bit output ports for PC interface	<p>①Inverting enable of output terminals. For the anti-control terminal, turn-on and cut-off definition are opposite from standard definition.</p> <p>②This parameter is expressed by a 3-bit binary number. 0 stands for the no anti-control output terminal, 1 stands for the anti-control output terminal. Here's a input terminal of binary number below:</p> <table><tr><td>2</td><td>1</td><td>0</td></tr><tr><td>PhaseA_O</td><td>PhaseB_O</td><td>PhaseZ_O</td></tr></table> <p>PhaseA_O:Phase A output of rotor position; PhaseB_O:Phase B output of rotor position; PhaseZ_O: Phase Z output of rotor position.</p>	2	1	0	PhaseA_O	PhaseB_O	PhaseZ_O	0~7						
2	1	0													
PhaseA_O	PhaseB_O	PhaseZ_O													
15	Gain of analog torque command input	<p>①Set proportion relationship between analog torque input voltage and actual motor torque;</p> <p>②Parameter unit is 100%/0.1V;</p> <p>③The default value is 100, corresponding to 100%/10V (Input 10V to generate 100% of nominal torque).</p>	10~300												
16	The bias compensation of analog torque input	<p>①The zero-bias compensation for the analog torque input;</p> <p>②Parameter unit is mV.</p>	-30000~30000mV												
17	Invert enable of analog torque input	<p>①Set the parameter to 0, as the analog torque command is positive, motor runs in reverse rotation (CW) direction,;</p> <p>②Set the parameter to 1, as the analog torque command is positive, motor runs forward rotation (CCW) direction.</p>	0~1												

18	Gain of analog speed command input	①Set proportion relationship between the input voltage of analog speed and actual motor speed; ②Parameter unit is 3000rpm/0.1V; ③The default value is 100, corresponding to 3000rpm/10V.	10~300
19	The bias compensation of analog speed input	①The zero-bias compensation for the analog speed input; ②Parameter unit is mV.	-30000~30000mV
20	Invert enable of analog speed input	①Set the parameter to 0, as the analog speed command is positive, motor runs in reverse rotation (CW) direction,; ②Set the parameter to 1, as the analog speed command is positive, motor runs forward rotation (CCW) direction.	0~1
21	Low-pass bandwidth of analog speed input	① Low-pass filter of the analog speed input. ②The greater the value is, it would bring faster response of analog speed input and more signal noise; The smaller the value is, it would bring slower response of analog speed input and less signal noise.	1~1000Hz
22	Torque overload alarm value	①Torque overload value. The value is the percentage of nominal torque which effects both direction(CW/CCW); ②As the motor torque > PN22 and lasting time > PN23, the drive will alarm Err-18 the motor will stop.	1~400
23	Torque overload testing time	①Parameter unit is ms; ②As the motor torque > PN22 and lasting time > PN23, the drive will alarm Err-18, the motor will stop.	1~32767ms
24	Internal brake resistor temperature alarm	①Set 1, internal brake resistor temperature alarm enabled; ②Set 0, internal brake resistor temperature alarm disabled.	0~1
25	Internal reverse rotation (CW) torque limit	①Used to limit the torque in the reverse rotation driving mode; ②Parameter value is the percentage of nominal torque, for example, the value of 200 if it is set to 2 times of the nominal torque; ③This limitation is valid all time; ④Actual torque limit equals to the allowed peak overload on the condition that the setting value exceed the allowed peak overload.	1~400
26	Internal forward rotation (CCW) torque limit	①Used to limit the torque in the forward rotation driving mode ②Parameter value is the percentage of nominal torque, for example, the value of 200 if it is set to 2 times of the nominal torque; ③This limitation is valid all time; ④Actual torque limit equals to the allowed peak overload on the condition that the setting value exceed the allowed peak overload.	1~400
27	External CW torque limit(NOT Support)	①Set the external torque limit for motor CW; ②Parameter value is the percentage of nominal torque, for example, the value of 100 if it is set to 1 time of the nominal torque; ③The limitation is valid only when the CW torque limit input terminal ON; ④The actual torque limit is the minimum value among allowed peak overload,CW internal torque limit and CW external torque limit as the limitation is valid.	1~400
28	External CCW torque limit(NOT Support)	①Set the external torque limit for motor CCW; ②Parameter value is the percentage of nominal torque, for example, the value of 100 if it is set to 1 time of the nominal torque; ③The limitation is valid only when the CCW torque limit input terminal ON; ④The actual torque limit is the minimum value among allowed peak overload,CCW internal torque limit and CCW external torque limit as the limitation is valid.	1~400
29	Speed limit during torque control	①Limit the maximum speed in torque control mode, parameter unit is rpm; ②Avoid overspeed when the motor unloaded.	0~3000
30	Speed loop gain	①Set the speed loop proportional gain; ②The larger the value is, the greater the stiffness would be. The value is determined by the type of servo and the load condition. In general, larger load inertia needs larger value. ③If there is no oscillation, the higher the value is the better the servo system performs.	1~8000

31	Speed loop integral time constant	①Set the speed loop integral time constant; ②The smaller the value, the greater the stiffness. The value is determined by the type of servo and the load condition. In general, larger load inertia needs larger value. ③Set the parameter as small as possible without oscillation.	1~8000
32	Low-pass bandwidth of speed loop	①Set the characteristics of speed detection filter; ②Normally, smaller value results in slower and smoother speed response. Too small value may cause system oscillation.	1~1000Hz
33	Low-pass filter bandwidth of torque command	①Set the characteristics of speed detection filter; ②Normally, smaller value results in slower and smoother speed response. But too much small value may cause system oscillation.	50~1000 Hz
34	Time constant of linear speed acceleration	①The value means motor accelerates from 0 to 1000 r/min, the unit $\times 0.01s$ ; ②Characteristics of acceleration and deceleration is linear; the range of valid value from 1 to 10000; ③Effective in speed control mode only; ④If the drive works in position control mode or the external position loop, the parameter should be set to 0.	0~10000
35	Time constant of linear speed deceleration	①The value means motor decelerates from 1000 to 0 r/min, the unit $\times 0.01s$ ; ②Characteristics of acceleration and deceleration is linear; the range of valid value from 1 to 10000; ③Effective in speed control mode only; ④If the drive works in position control mode or the external position loop, the parameter should be set to 0.	0~10000
36	Internal speed 1	①Set the first internal speed; ②In speed control mode, select the first internal speed as the speed command when SC1 OFF, SC2 OFF.	-6000~6000
37	Internal speed 2(NOT Support)	①Set the first internal speed; ②In speed control mode, select the second internal speed as the speed command when SC1 OFF, SC2 ON.	-6000~6000
38	Internal speed 3(NOT Support)	①Set the first internal speed; ②In speed control mode, select the third internal speed as the speed command when SC1 ON, SC2 OFF.	-6000~6000
39	Internal speed 4(NOT Support)	①Set the first internal speed; ②In speed control mode, select the fourth internal speed as the speed command when SC1 ON, SC2 ON.	-6000~6000
40	Internal or external speed command selection	①Set the parameter to 0, select the internal speed control mode; ②Set the parameter to 1, select the external speed control mode.	0~1
41	Speed setting in JOG mode (NOT Support)	Set the operation speed in JOG control mode.	0~3000
42	Peak speed limitation	①Set the maximum speed limitation of servo motor; ②The function is effective in both CCW and CW direction; ③The selected speed equals to actual peak speed if it is smaller than the value.	0~6000
43	Target speed	①Position target speed, the unit is r/min; ②In non-position control mode, if the motor speed exceeds the set value, then COIN ON, otherwise COIN OFF; ③This parameter is not effective in position control mode,; ④CCW and CW directions are both effective; ⑤The comparator has hysteresis characteristics.	1~6000
44	Position loop gain	①Set the speed loop proportional gain; ②Higher gain results in greater mechanical stiffness and less position tracking error. Too large value may cause overshoot or oscillation. ③The value is determined by the type and the load of servo drive.	1~10000
45	Difference coefficient ratio of position loop	①Set the difference gain of position loop; ② Higher gain results in greater mechanical stiffness and less position tracking error. Too big value may cause overshoot or oscillation; ③This parameter is usually set to zero unless very fast response is required.	0~8000
46	The cut-off frequency of	①Set the low-pass filter cut-off frequency of position loop feed forward.	1~300

	position feed forward filter	the unit is Hz; ②The filter is used to increase the stability of compound position control.	
47	Constant of position command filter	①Smoothen filter for the command pulse with the accelerate of index form, the value stands for time constant. The unit is ms; ②Filter would not lose input pulse but may lead to delay; ③The filter works in the follow conditions: <ul style="list-style-type: none"> <li>• Host controller has not acceleration and deceleration function;</li> <li>• Larger electronic gear ratio (&gt; 10);</li> <li>• Lower command frequency;</li> <li>• Motor running with jumps or other unstable conditions;</li> </ul> ④Filter is inactive as set to 0.	0~1000
48	Denominator of position gearbox	①Set the denominator of sub-octave for position command pulse (electric gear); ②In the position control mode, conveniently match with any pulse source by setting parameters PN48 and PN49 to meet the ideal control resolution (angle/pulse); ③ $P \times G = N \times C \times 4$ P : Input command pulse number; G: Electronic gear ratio; N: The revolving circle of the motor; C: The photoelectric encoder C/T, this system is C=2500; ④For example, the motor runs one circle when the input command pulse is 6000 $G = \frac{N \times C \times 4}{P} = \frac{1 \times 2500 \times 4}{6000} = \frac{5}{3}$ So please set PN49=5, PN48=3 ⑤Recommendatory range of electronic gear ratio: $1/50 \leq G \leq 50$	1~30000
49	Divider numerator of the first position command pulse	①Set the first position command pulse sub-octave (electronic gear); ②Set parameter PN51 to 1 as using the dynamic electronic gear, meanwhile the function of input terminal INH (command pulse forbidden) translates into control terminal of electronic gear switching input.	1~30000
50	Divider numerator of the second position command pulse(NOT Support)	①Set the second position command pulse sub-octave (electronic gear); ②Set parameter PN51 to 1 as using the dynamic electronic gear, meanwhile the function of input terminal INH (command pulse forbidden) translates into control terminal of electronic gear switching input.	1~30000
51	Dynamic electronic gear enable(NOT Support)	①Set to 0, dynamic electronic gearbox is inactive. ②Set to 1, dynamic electronic gearbox is active. ③When dynamic electronic gearbox is active, the input terminal INH(Inhibit Position instruction) functions as a switch to select electronic gear ratio generated by the first or the second numerator; ④When dynamic electronic gearbox is active, if INH terminal is inactive, the active G=PN50/PN48; If INH terminal is active, the active G=PN49/PN48; By controlling INH terminal, PLC cant switch the electronic gear ratio.	0~1
52	Position command pulse input mode	①Set the input form of position command pulse; ②Three position command types are supported as following: 0: Pulse + symbol; 1: CCW pulse / CW pulse; 2: Two-phase orthogonal pulse input; ③CCW is defined as positive direction on the condition that it rotates with anti-clockwise direction from the axial view.	0~2
53	Invert direction of position command pulse	Select condition: 0: Normal; 1: Reverse the direction of position command pulse.	0~1
54	Positioning completed range	①Position range indicates the motor has reached the target location; ②In position control mode or point to point mode, if the position error drops in the target position range, the output terminal COIN turns active, otherwise COIN remains inactive.	0~30000
55	Range of position super-homodyne detection	①Set the detection range for position tolerance alarm; ②The drive will issue position tolerance alarm when the position offset counter value exceeds the selected value×100 in position control mode.	1~30000

56	Enable position error	Select condition: 0: position tolerance alarm detection enabled; 1: position tolerance alarm detection disabled and position tolerance error detection is stopped.	0~1
57	Position pulse feedback ratio	①The feedback ratio of position pulse determines the ratio of the internal and output position pulse: ②[4:0] : Feedback setting: B, Ratio=A/B. ③[9:5] : Feedback setting: A, Ratio=A/B. ④[15:10] : Reserved. ⑤Normal setting : 1:1 => 33 (00001_00001) 1:2 => 34 (00001_00010) 1:4 => 36 (00001_00100) 1:5 => 37 (00001_00101) 1:10 => 42 (00001_01010) ⑥(Ratio x Encoder pulse number) should be a integer.	1~1023
58	Home position(NOT Support)	The mode of capture Home signal. Three homing methods are supported. ①Set PN58 to 0, the servo seeks home position with CW limit switch; Servo would move in CW direction until meets CW limit switch, then turns back and treats the first Index signal as home position; ②Set PN58 to 1, the servo seeks home position with CCW limit switch. Servo would move in CCW direction until meets CCW limit switch, then turns back and treats the first Index signal as home position; ③Set PN58 to 2, the current position is set as home position.	0~3
59	Homing speed(NOT Support)	①The maximum running speed for motor in the process of seeking home position; ②The speed value is effective in both CCW and CW direction. The unit is r/min; ③Caution: Too fast homing speed may cause mechanical damage at limit switch.	1~6000
60	Homing acceleration/ deceleration speed(NOT Support)	①The acceleration and deceleration value in the process of seeking home position; ②The value is effective in both CCW and CW direction. The unit is r/(s*s); ③Caution: Too weak acceleration and deceleration speed may cause mechanical damage at limit switch.	1~1000
61	High bit of home offset(NOT Support)	①A 16-bit space is narrow for a 32-bit. So the home offset is stored to high-bit and low-bit; ②The actual origin offset = PN61×10000+PN62.	-30000~30000
62	Low bit of home offset(NOT Support)	①A 16-bit space is narrow for a 32-bit. So the home offset is stored to high-bit and low-bit; ②The actual origin offset = PN61×10000+PN62.	-9999~9999
63	Demo or point-to-point mode(NOT Support)	①Demo mode or point-to-point mode; ②Set to 0, the drive will work in torque demo mode. From step 1 to 10, servo runs each step one by one and loops forever. In every step torque value and lasting time can be set independently. ③Set to 1, the drive will work in speed demo mode. From step 1 to 10, servo runs each step one by one and loops forever. In every step torque value and lasting time can be set independently. ④Set to 2, the drive will work in position demo mode, From step 1 to 10, servo runs each step one by one and loops forever. In every step position, speed, acceleration and maximum torque value can be set independently. ⑤Set to 3, the drive will work in absolute value point-to-point mode. ⑥Set to 4, the drive will work in increment point-to-point mode.. ⑦There are four parameters can be selected independently: Position, Speed, Acceleration and Maximum Torque in point-to-point mode. The position index is determined by input terminals { CCWTLtd, CWTLtd, SC1, SC2 }: If CCWTLtd=0, CWTLtd=0, SC1=0, SC2=0, then select position 1; If CCWTLtd=0, CWTLtd=0, SC1=0, SC2=1, then select position 2; If CCWTLtd=0, CWTLtd=0, SC1=1, SC2=0, then select position 3; ..... If CCWTLtd=1, CWTLtd=0, SC1=1, SC2=1, then select position 12; ..... If CCWTLtd=1, CWTLtd=1, SC1=1, SC2=0 then select position 15; If CCWTLtd=1, CWTLtd=1, SC1=1, SC2=1, then select position 16;	0~3

64	Torque value 1 in torque mode(NOT Support)	①Set the first torque value in torque demo mode; ②Parameter value is the percentage of the nominal torque, for example, if you want to set maximum torque to the 1 times of the nominal torque, the parameter is 100.	-400~40 0
65	Demo time 1 in torque mode(NOT Support)	①Set the first duration in torque demo mode. ②Parameter unit is second.	0~3600
66	Torque value 2 in torque mode(NOT Support)	①Set the second torque value in torque demo mode; ②Parameter value is the percentage of the nominal torque, for example, if you want to set maximum torque to the 1 times of the nominal torque, the parameter is 100.	-200~20 0
67	Demo time 2 in torque mode(NOT Support)	①Set the second duration in torque demo mode. ②Parameter unit is second.	0~3600
68	Torque value 3 in torque mode(NOT Support)	①Set the third torque value in torque demo mode; ②Parameter value is the percentage of the nominal torque, for example, if you want to set maximum torque to the 1 times of the nominal torque, the parameter is 100.	-200~20 0
69	Demo time 3 in torque mode(NOT Support)	①Set the third duration in torque demo mode. ②Parameter unit is second.	0~3600
70	Torque value 4 in torque mode(NOT Support)	①Set the fourth torque value in torque demo mode; ②Parameter value is the percentage of the nominal torque, for example, if you want to set maximum torque to the 1 times of the nominal torque, the parameter is 100.	-200~20 0
71	Demo time 4 in torque mode(NOT Support)	①Set the fourth duration in torque demo mode. ②Parameter unit is second.	0~3600
72	Torque value 5 in torque mode(NOT Support)	①Set the fifth torque value in torque demo mode; ②Parameter value is the percentage of the nominal torque, for example, if you want to set maximum torque to the 1 times of the nominal torque, the parameter is 100.	-200~20 0
73	Demo time 5 in torque mode(NOT Support)	①Set the fifth duration in torque demo mode. ②Parameter unit is second.	0~3600
74	Torque value 6 in torque mode(NOT Support)	①Set the sixth torque value in torque demo mode; ②Parameter value is the percentage of the nominal torque, for example, if you want to set maximum torque to the 1 times of the nominal torque, the parameter is 100.	-200~20 0
75	Demo time 6 in torque mode (NOT Support)	①Set the sixth duration in torque demo mode. ②Parameter unit is second.	0~3600
76	Torque value 7 in torque mode(NOT Support)	①Set the seventh torque value in torque demo mode; ②Parameter value is the percentage of the nominal torque, for example, if you want to set maximum torque to the 1 times of the nominal torque, the parameter is 100.	-200~20 0
77	Demo time 7 in torque mode(NOT Support)	①Set the seventh duration in torque demo mode. ②Parameter unit is second.	0~3600
78	Torque value 8 in torque mode(NOT Support)	①Set the seventh torque value in torque demo mode; ②Parameter value is the percentage of the nominal torque, for example, if you want to set maximum torque to the 1 times of the nominal torque, the parameter is 100.	-200~20 0
79	Demo time 8 in torque mode(NOT Support)	①Set the eighth duration in torque demo mode. ②Parameter unit is second.	0~3600
80	Torque value 9 in torque mode(NOT Support)	①Set the ninth torque value in torque demo mode; ②Parameter value is the percentage of the nominal torque, for example, if you want to set maximum torque to the 1 times of the nominal torque, the parameter is 100.	-200~20 0
81	Demo time 9 in torque mode(NOT Support)	①Set the ninth duration in torque demo mode. ②Parameter unit is second.	0~3600
82	Torque value 10 in torque mode(NOT Support)	①Set the tenth torque value in torque demo mode; ②Parameter value is the percentage of the nominal torque, for example, if you want to set maximum torque to the 1 times of the nominal torque, the parameter is 100.	-200~20 0
83	Demo time 10 in torque mode(NOT Support)	①Set the tenth duration in torque demo mode. ②Parameter unit is second.	0~3600

84	Speed value 1 in speed mode(NOT Support)	①Set the first speed value in the speed demo mode; ②Parameter unit is rpm.	-6000~6000
85	Demo time 1 in speed mode(NOT Support)	①Set the first duration in the speed demo mode; ②Parameter unit is second.	0~3600
86	Speed value 2 in speed mode(NOT Support)	①Set the second speed value in speed demo mode; ②Parameter unit is rpm..	-6000~6000
87	Demo time 2 in speed mode(NOT Support)	①Set the second duration of speed value in speed demo mode; ②Parameter unit is second.	0~3600
88	Speed value 3 in speed mode(NOT Support)	①Set the third speed value in speed demo mode; ②Parameter unit is rpm.	-6000~6000
89	Demo time 3 in speed mode(NOT Support)	①Set the third duration of speed value in speed demo mode; ②Parameter unit is second.	0~3600
90	Speed value 4 in speed mode(NOT Support)	①Set the fourth speed value in speed demo mode; ②Parameter unit is rpm.	-6000~6000
91	Demo time 4 in speed mode(NOT Support)	①Set the fourth duration of speed value in speed demo mode ②Parameter unit is second.	0~3600
92	Speed value 5 in speed mode(NOT Support)	①Set the fifth speed value in speed demo mode; ②Parameter unit is rpm.	-6000~6000
93	Demo time 5 in speed mode(NOT Support)	①Set the fifth duration of speed value in speed demo mode; ②Parameter unit is second.	0~3600
94	Speed value 6 in speed mode(NOT Support)	①Set the sixth speed value in speed demo mode; ②Parameter unit is rpm.	-6000~6000
95	Demo time 6 in speed mode(NOT Support)	①Set the sixth duration of speed value in speed demo mode; ②Parameter unit is second.	0~3600
96	Speed value 7 in speed mode(NOT Support)	①Set the seventh speed value in speed demo mode; ②Parameter unit is rpm.	-6000~6000
97	Demo time 7 in speed mode(NOT Support)	①Set the seventh duration of speed value in speed demo mode; ②Parameter unit is second.	0~3600
98	Speed value 8 in speed mode(NOT Support)	①Set the eighth speed value in speed demo mode; ②Parameter unit is rpm.	-6000~6000
99	Demo time 8 in speed mode(NOT Support)	①Set the ninth duration of speed value in speed demo mode; ②Parameter unit is second.	0~3600
100	Speed value 9 in speed mode(NOT Support)	①Set the ninth speed value in speed demo mode; ②Parameter unit is rpm.	-6000~6000
101	Demo time 9 in speed mode(NOT Support)	①Set the ninth duration of speed value in speed demo mode; ②Parameter unit is second.	0~3600
102	Speed value 10 in speed mode(NOT Support)	①Set the tenth speed value in speed demo mode; ②Parameter unit is rpm.	-6000~6000
103	Demo time 10 in speed mode(NOT Support)	①Set the tenth duration of speed value in speed demo mode; ②Parameter unit is second.	0~3600
104	High bit of position command 1 in position mode(NOT Support)	①Set the first high bit command value in position demo mode; ②The value of position 1 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
105	Low bit of position command 1 in position mode(NOT Support)	①Set up the first low bit command value in position demo mode. ②The value of position 1 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~9999
106	Speed of position command 1 in position mode(NOT Support)	①The speed value of position 1; ②Parameter unit is rpm.	0~6000
107	Acceleration/deceleration of position command 1 in position mode(NOT Support)	①The acceleration / deceleration in position 1; ②The acceleration and deceleration share the same value.	1~1000
108	Peak torque of position command 1 in position mode(NOT Support)	①The maximum torque in position 1; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400

109	High bit of position command 2 in position mode(NOT Support)	①Set the second high bit command value in position demo mode; ②The value of position 2 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
110	Low bit of position command 2 in position mode(NOT Support)	①Set the second low bit command value in position demo mode; ②The value of position 2 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~999
111	Speed of position command 2 in position mode(NOT Support)	①The speed value of position 2; ②Parameter unit is rpm.	0~6000
112	Acceleration / deceleration of position command 2 in position mode(NOT Support)	①The acceleration / deceleration in position 2; ②The acceleration and deceleration share the same value..	1~1000
113	Peak torque of position command 2 in position mode(NOT Support)	①The maximum torque in position 2; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
114	High bit of position command 3 in position mode(NOT Support)	①Set the third high bit command value in position demo mode; ②The value of position 3 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
115	Low bit of position command 3 in position mode(NOT Support)	①Set the third low bit command value in position demo mode; ②The value of position 3 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~999
116	Speed of position command 3 in position mode(NOT Support)	①The speed value of position 3; ②Parameter unit is rpm.	0~6000
117	Acceleration / deceleration of position command 3 in position mode(NOT Support)	①The acceleration / deceleration in position 3; ②The acceleration and deceleration share the same value..	1~1000
118	Peak torque of position command 3 in position mode(NOT Support)	①The maximum torque in position 3; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
119	High bit of position command 4 in position mode(NOT Support)	①Set the fourth high bit command value in position demo mode; ②The value of position 4 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
120	Low bit of position command 4 in position mode(NOT Support)	①Set the fourth low bit command value in position demo mode; ②The value of position 4 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~999
121	Speed of position command 4 in position mode(NOT Support)	①The speed value of position 4; ②Parameter unit is rpm.	0~6000
122	Acceleration / deceleration of position command 4 in position mode(NOT Support)	①The acceleration / deceleration in position 4; ②The acceleration and deceleration share the same value..	1~1000
123	Peak torque of position command 4 in position mode(NOT Support)	①The maximum torque in position 4; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
124	High bit of position command 5 in position mode(NOT Support)	①Set the fifth high bit command value in position demo mode; ②The value of position 5 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
125	Low bit of position command 5 in position mode(NOT Support)	①Set the fifth low bit command value in position demo mode; ②The value of position 5 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~999
126	Speed of position command 5 in position mode(NOT Support)	①The speed value of position 5; ②Parameter unit is rpm.	0~6000



127	Acceleration / deceleration of position command 5 in position mode(NOT Support)	①The acceleration / deceleration in position 5; ②The acceleration and deceleration share the same value..	1~1000
128	Peak torque of position command 5 in position mode(NOT Support)	①The maximum torque in position 5; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
129	High bit of position command 6 in position mode(NOT Support)	①Set the sixth high bit command value in position demo mode; ②The value of position 6 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
130	Low bit of position command 6 in position mode(NOT Support)	①Set the sixth low bit command value in position demo mode; ②The value of position 6 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~9999
131	Speed of position command 6 in position mode(NOT Support)	①The speed value of position 6; ②Parameter unit is rpm.	0~6000
132	Acceleration / deceleration of position command 6 in position mode(NOT Support)	①The acceleration / deceleration in position 6; ②The acceleration and deceleration share the same value..	1~1000
133	Peak torque of position command 6 in position mode(NOT Support)	①The maximum torque in position 6; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
134	High bit of position command 7 in position mode(NOT Support)	①Set the seventh high bit command value in position demo mode; ②The value of position 7 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
135	Low bit of position command 7 in position mode(NOT Support)	①Set the seventh low bit command value in position demo mode; ②The value of position 7 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~9999
136	Speed of position command 7 in position mode(NOT Support)	①The speed value of position 7; ②Parameter unit is rpm.	0~6000
137	Acceleration / deceleration of position command 7 in position mode(NOT Support)	①The acceleration / deceleration in position 7; ②The acceleration and deceleration share the same value..	1~1000
138	Peak torque of position command 7 in position mode(NOT Support)	①The maximum torque in position 7; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
139	High bit of position command 8 in position mode(NOT Support)	①Set the eighth high bit command value in position demo mode; ②The value of position 8 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
140	Low bit of position command 8 in position mode(NOT Support)	①Set the eighth low bit command value in position demo mode; ②The value of position 8 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~9999
141	Speed of position command 8 in position mode(NOT Support)	①The speed value of position 8; ②Parameter unit is rpm.	0~6000
142	Acceleration / deceleration of position command 8 in position mode (NOT Support)	①The acceleration / deceleration in position 8; ②The acceleration and deceleration share the same value..	1~1000
143	Peak torque of position command 8 in position mode(NOT Support)	①The maximum torque in position 8; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
144	High bit of position command 9 in position mode(NOT Support)	①Set the ninth high bit command value in position demo mode; ②The value of position 9 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000

145	Low bit of position command 9 in position mode(NOT Support)	①Set the ninth low bit command value in position demo mode; ②The value of position 9 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~999
146	Speed of position command 9 in position mode(NOT Support)	①The speed value of position 9; ②Parameter unit is rpm.	0~6000
147	Acceleration / deceleration of position command 9 in position mode(NOT Support)	①The acceleration / deceleration in position 9; ②The acceleration and deceleration share the same value..	1~1000
148	Peak torque of position command 9 in position mode(NOT Support)	①The maximum torque in position 9; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
149	High bit of position command 10 in position mode(NOT Support)	①Set the tenth high bit command value in position demo mode; ②The value of position 10 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
150	Low bit of position command 10 in position mode(NOT Support)	①Set the tenth low bit command value in position demo mode; ②The value of position 10 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~999
151	Speed of position command 10 in position mode(NOT Support)	①The speed value of position 10; ②Parameter unit is rpm.	0~6000
152	Acceleration / deceleration of position command 10 in position mode(NOT Support)	①The acceleration / deceleration in position 10; ②The acceleration and deceleration share the same value..	1~1000
153	Peak torque of position command 10 in position mode(NOT Support)	①The maximum torque in position 10; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
154	High bit of position command 11 in position mode(NOT Support)	①Set the eleventh high bit command value in position demo mode; ②The value of position 11 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
155	Low bit of position command 11 in position mode(NOT Support)	①Set the eleventh low bit command value in position demo mode; ②The value of position 11 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~999
156	Speed of position command 11 in position mode(NOT Support)	①The speed value of position 11; ②Parameter unit is rpm.	0~6000
157	Acceleration / deceleration of position command 11 in position mode(NOT Support)	①The acceleration / deceleration in position 11; ②The acceleration and deceleration share the same value..	1~1000
158	Peak torque of position command 11 in position mode(NOT Support)	①The maximum torque in position 11; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
159	High bit of position command 12 in position mode(NOT Support)	①Set the twelfth high bit command value in position demo mode; ②The value of position 12 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
160	Low bit of position command 12 in position mode(NOT Support)	①Set the twelfth low bit command value in position demo mode; ②The value of position 12 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~999
161	Speed of position command 12 in position mode(NOT Support)	①The speed value of position 12; ②Parameter unit is rpm.	0~6000
162	Acceleration / deceleration of position command 12 in position mode(NOT Support)	①The acceleration / deceleration in position 12; ②The acceleration and deceleration share the same value..	1~1000

163	Peak torque of position command 12 in position mode(NOT Support)	①The maximum torque in position 12; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
164	High bit of position command 13 in position mode(NOT Support)	①Set the thirteenth high bit command value in position demo mode; ②The value of position 13 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
165	Low bit of position command 13 in position mode(NOT Support)	①Set the thirteenth low bit command value in position demo mode; ②The value of position 13 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~9999
166	Speed of position command 13 in position mode(NOT Support)	①The speed value of position 13; ②Parameter unit is rpm.	0~6000
167	Acceleration / deceleration of position command 13 in position mode(NOT Support)	①The acceleration / deceleration in position 13; ②The acceleration and deceleration share the same value..	1~1000
168	Peak torque of position command 13 in position mode(NOT Support)	①The maximum torque in position 13; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
169	High bit of position command 14 in position mode(NOT Support)	①Set the fourteenth high bit command value in position demo mode; ②The value of position 14 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
170	Low bit of position command 14 in position mode(NOT Support)	①Set the fourteenth low bit command value in position demo mode; ②The value of position 14 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~9999
171	Speed of position command 14 in position mode(NOT Support)	①The speed value of position 14; ②Parameter unit is rpm.	0~6000
172	Acceleration / deceleration of position command 14 in position mode(NOT Support)	①The acceleration / deceleration in position 14; ②The acceleration and deceleration share the same value..	1~1000
173	Peak torque of position command 14 in position mode(NOT Support)	①The maximum torque in position 14; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
174	High bit of position command 15 in position mode(NOT Support)	①Set the fifteenth high bit command value in position demo mode; ②The value of position 15 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
175	Low bit of position command 15 in position mode(NOT Support)	①Set the fifteenth low bit command value in position demo mode; ②The value of position 15 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-9999~9999
176	Speed of position command 15 in position mode(NOT Support)	①The speed value of position 15; ②Parameter unit is rpm.	0~6000
177	Acceleration / deceleration of position command 15 in position mode(NOT Support)	①The acceleration / deceleration in position 15; ②The acceleration and deceleration share the same value..	1~1000
178	Peak torque of position command 15 in position mode(NOT Support)	①The maximum torque in position 15; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400
179	High bit of position command 16 in position mode(NOT Support)	①Set the sixteenth high bit command value in position demo mode. ②The value of position 16 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	-30000~30000
180	Low bit of position	①Set the sixteenth low bit command value in position demo mode;	-9999~9999

	command 16 in position mode(NOT Support)	②The value of position 16 equals to high-bit value×10000+low-bit value. Parameter unit is pulse.	999
181	Speed of position command 16 in position mode(NOT Support)	①The speed value of position 16; ②Parameter unit is rpm.	0~6000
182	Acceleration / deceleration of position command 16 in position mode(NOT Support)	①The acceleration / deceleration in position 16; ②The acceleration and deceleration share the same value.	1~1000
183	Peak torque of position command 16 in position mode(NOT Support)	①The maximum torque in position 16; ②The value is the percentage of the nominal torque, for example, if you want to set maximum torque value as same as the nominal torque value, the parameter would be 100.	0~400

## Chapter 6 Protective Functions

### 6.1 Warning List

Table 6-1 Warning list

Alarm code	Name
--	Normal state
1	System initialization error alarm
2	Phase-Z pulse missing
3	Illegal code for encoder signal U/V/W
4	Encoder difference signal error
5	Encoder counter missing error
6	IPM module faulty
7	Main circuit relay disconnected
8	Main circuit overvoltage
9	Main circuit undervoltage
10	Motor temperature alarm
11	Motor phase current gain alarm
12	EEPROM access fault
13	Overcurrent alarm
14	Internal brake resistor overtemperature alarm
15	Drive forbidden abnormal
16	Position offset counter overflow
17	Position command overflow error
18	Torque overload alarm
19	Overspeed or larger offset alarm

### 6.2 Remedies for Alarms

Table 6-2 Remedies for alarms

Alarm code	Name	Running status	Reason	Processing method
1	System initialization error alarm		Power supply overvoltage	Reduce the power supply voltage.
2	Phase-Z pulse missing		①Z pulse does not exist, encoder faulty. ②Bad cables inhibit. ③Inhibit ground is not	①Change the encoder. ②Check the encoder interface circuit.

			connected well. ④Encoder interface circuit faulty.	
3	Illegal code for encoder signal U/V/W		①Encoder signal U/V/W faulty. ②Bad cable inhibit. ③Inhibit ground is not connected well. ④Encoder interface circuit faulty.	①Change the encoder. ②Check the encoder interface circuit.
4	Encoder difference signal faulty		Connector disconnected.	Check the control power supply.
			Encoder faulty.	Change the encoder.
5	Encoder counter missing error		①Encoder faulty. ②Wrong number of encoder lines. ③Encoder disc damaged. ④False signal Z in encoder	Change the encoder.
			Encoder wiring error.	Check wiring.
			Bad grounding.	①Grounding correct. ②Check the condition of inhibit ground.
6	IPM module faulty	Occurs When connected to the main power	①Circuit board faulty.	①Change the servo drive.
		Occurs as operating	①Low supply voltage. ②Overheat.	①Check the servo drive. ②Restart. ③Change the servo drive
			Short-circuit in U, V, W.	Check wiring.
			Bad grounding.	Grounding correct.
			Motor insulation faulty.	Change the servo motor.
			Interference nearby.	①Install a line filter. ②Leave away from interference source.
7	Main circuit relay disconnected	Occurs When connected to the main power	Power supply disconnected.	Check the main power supply.
		Occurs as operating	Motor faulty.	Change the servo motor.
8	Main circuit overvoltage	Occurs When connected to the main power	Circuit board faulty.	Change the servo drive.
			①Low supply voltage. ②Abnormal power supply voltage waveform.	Check the power supply.
		Occurs as operating	Brake resistor wiring disconnected.	Check wiring.
			①Brake transistors damaged. ②Internal brake resistor damaged.	Change the servo drive.

			Insufficient capacity for braking circuit.	①Reduce stop-start frequency. ②Increase acceleration / deceleration time constant ③Reduce the torque limit. ④Reduce the load inertia. ⑤Change a larger power drive and motor.
9	Main circuit undervoltage	Occurs When connected to the main power	①Circuit board faulty. ②Power supply insurance faulty. ③Soft-start circuit faulty. ④Rectifier failure.	Change the servo drive.
			①Low supply voltage. ②Temporary power failure for more than 20ms.	Check the power supply.
		Occurs as operating	① Insufficient capacity for power. ②Instantaneous power-off.	Check the power supply.
			Radiators overheat.	Check load.
10	Motor ( $IR^2$ ) over temperature	Occurs as operating	Overcurrent	①Check the parameter is correct or not. ②Change the servo drive.
			Motor overloaded	Change a larger power drive and motor.
11	Motor phase current gain alarm		Motor overcurrent	Change the servo drive.
12	EEPROM access fault		Chip or circuit board failure.	①Change the servo drive. ②Reset the parameters after repairing.
13	Overcurrent alarm		Short-circuit in U,V,W.	Check wiring.
			Bad grounding.	Ground correct.
			Motor insulation damaged.	Change the servo motor
			Servo drive damaged.	Change the servo drive.
14	Internal brake resistor overtemperature alarm		Main power supply overvoltage.	Reduce the main supply voltage.
			The impedance of the brake resistor is too large.	Reduce the impedance of the brake resistor.
			Motor overloaded	Reduce the load.
15	Drive forbidden abnormal		Disconnect CCW/CW drive forbidden input terminals.	Check the power for wiring and input terminal.
16	Position offset counter overflow	Occurs as operating	①Motor is blocked up. ②Abnormal input pulse.	①Check the mechanical parts of load. ②Check the command pulse. ③Check whether the motor works correctly.

17	Position command overflow error	Occurs When connected to the main power	Circuit board faulty.	Change the servo drive.
		Connect main power and control wire,input command pulse, motor does not operate or with opposite direction	①Wrong wiring of U, V, W. ②Wrong wiring of the encoder cable.	Connect correctly.
			①Zero point changed. ②Encoder faulty.	①Re-adjust the zero point. ②Change the servo motor.
		Occurs as operating	Smaller detection range for position tolerance.	Increase detection range for position tolerance.
			Smaller position proportional gain is.	Increase the gain.
			Insufficient torque.	①Check the torque limit . ②Reduce the load capacity. ③Change a servo system (including motor and drive) with larger power.
			Higher command pulse frequency.	Reduce the frequency.
			Zero point changed	Re-adjust the zero point.
18	Torque overload alarm		①Wrong Parameters. ②Happen to appear overload.	①Modify the parameters. ②Mechanical maintenance.
19	Overspeed or larger offset alarm	Occurs When connected to the main power	①Control circuit board faulty. ②Encoder faulty.	①Change the servo drive. ②Change the servo motor.
		Occurs as operating	Input command pulse overfrequency.	Set the input command pulse correctly.
			Too small acceleration / deceleration time constant can cause overshoot speed.	Increase the acceleration / deceleration time constant.
			Larger input electronic gear ratio.	Set correctly.
			Encoder faulty.	Change the servo motor.